Gene H. Shioda, Esq. (SBN #186780)
ghs@shiodakim.com
Law Office of Gene H. Shioda
5757 W. Century Blvd., Suite 700
Los Angeles, CA 90045

Attorney for Plaintiff Group-A Autosports, Inc.

UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA - EASTERN DIVISION

GROUP-A AUTOSPORTS, INC. Plaintiff, vs. DNA MOTOR, INC. Defendant.	Civil Action No.: 5:14-cv-02606-BRO SECOND AMENDED COMPLAINT Complaint Filed: December 22, 2014 Assigned: Hon. Beverly Reid O'Connell Magistrate Judge: Scheduling Conf.: April 13, 2015

The plaintiff, Group-A Autosports, Inc., files this Second Amended Complaint against the defendant, DNA Motor Inc., and alleges as follows:

PARTIES

1. Plaintiff, Group-A Autosports, Inc., is a California corporation having a principal place of business at 2050 5th Street, Norco, CA 92860.

2. On information and belief, Defendant, DNA Motor Inc., is a California

corporation having a principal place of business at 801 S. Sentous Street, City of Industry, CA 91748.

JURISDICTION AND VENUE

3. This action arises under the patent laws of the United States, 35 U.S.C. §1 *et seq*. and California Civil Code §17203.

4. This Court has subject matter jurisdiction over the patents claims pursuant to 28 U.S.C. §§1331 and 1338(a). This Court has subject matter jurisdiction over the state law claim under the doctrine of pendent jurisdiction.

5. This Court has personal jurisdiction over the defendant based upon its contacts with this forum, including a physical address and place of business located within the State of California and this district.

6. Venue is proper in this judicial district pursuant to 28 U.S.C. §§1391(b) and 1400(b).

GENERAL FACTS

7. Plaintiff is the sole owner of U.S. Patent No. 8,267,413 that issued on September 18, 2012. A copy of U.S. Patent No. 8,267,413 is attached hereto as Exhibit A. U.S. Patent No. 8,267,413 is valid and enforceable.

8. Plaintiff is the sole owner of U.S. Patent No. 7,857,332 that issued on

December 28, 2010. A copy of U.S. Patent No. 7,857,332 is attached hereto as Exhibit B. U.S. Patent No. 7,857,332 expired on December 28, 2014, and was valid and enforceable during its original term.

9. Plaintiff is the sole owner of U.S. Patent No. D602,408 that issued on October 20, 2009. A copy of U.S. Patent No. D602,408 is attached hereto as Exhibit C. U.S. Patent No. D602,408 is valid and enforceable.

10. Plaintiff is the sole owner of U.S. Patent No. D624,460 that issued on September 28, 2010. A copy of U.S. Patent No. D624,460 is attached hereto as Exhibit D. U.S. Patent No. D624,460 is valid and enforceable.

11. Plaintiff is the sole owner of U.S. Patent No. D624,855 that issued on October 5, 2010. A copy of U.S. Patent No. D624,855 is attached hereto as Exhibit E. U.S. Patent No. D624,855 is valid and enforceable.

12. Plaintiff designs, markets, and sells aftermarket automobile and automobile engine parts to consumers throughout the United States thru its web site (www.skunk2.com), online stores, and brick and mortar speciality stores.

13. Over the last fifteen (15) years, plaintiff has invested millions of dollars in research and development to produce and sell high quality products under its federally registered marks SKUNK2 RACING® and SKUNK2® (hereinafter the "Marks"). Plaintiff's products are carefully designed in-house using the latest computer simulation and modeling techniques followed by careful testing in

controlled laboratory environments using state-of-the-art equipment. Each SKUNK2® product is subjected to rigorous dyno, street, and race track testing to ensure proper performance in the most extreme conditions.

14. Over the last fifteen (15) years, plaintiff has invested millions of dollars in advertising of the Marks. The Marks have become well known and famous to dealers and consumers in the aftermarket automobile and automobile engine parts industry. Dealers and consumers associate the Marks with high quality aftermarket automobile parts and automobile engine parts that have been designed, tested, manufactured, and supplied by plaintiff.

15. A picture of plaintiff's genuine camber arm is attached hereto as Exhibit F attached hereto (hereinafter the "Genuine Product"). The Genuine Product sells for about $217.

COUNT I - PATENT INFRINGEMENT - U.S. PATENT NO. 7,857,332

16. Plaintiff re-alleges each and every allegation set forth in Paragraphs 1-15 of this Complaint as if fully alleged herein.

17. On information and belief, defendant has and continues to import, use, advertise, offer for sale, and/or sell a first camber arm (Part No. believed to CBK-HC96) to retail stores and directly to consumers throughout the United States, including the State of California (hereinafter the "First Product").

18. A copy of two (2) advertisements for the First Product are attached hereto as Exhibit G. Defendant is selling the First Product for about $138 to $194.

19. On October 30, 2014, plaintiff sent defendant a letter requesting it to cease and desist from any further sale of the First Product. A copy of the letter dated October 30, 2014, is attached hereto as Exhibit H (the "Letter"). Defendant received the Letter.

20. On information and belief, defendant has and is continuing to import, use, advertise, offer for sale, and/or sell a second camber arm (Part No. believed to be CBK-HC88) to retail stores and directly to consumers throughout the United States, including the State of California (hereinafter the "Second Product").

21. A copy of an advertisement for the Second Product is attached hereto as Exhibit I attached hereto. Defendant is selling the Second Product for about $69.

22. On information and belief, defendant has and is continuing to import, use, advertise, offer for sale, and/or sell a third camber arm (Part No. unknown) to retail stores and directly to consumers throughout the United States, including the State of California (hereinafter the "Third Product").

23. A copy of an advertisement for the Third Product is attached hereto as Exhibit J. Defendant is selling the Third Product for about $166.

24. Defendant's import, use, offer for sale, and/or sale of the First Product, the Second Product, and/or the Third Product infringed U.S. Patent No. 7,857,332 in

violation of 35 U.S.C. §271.

25. Upon information and belief, defendant's infringement of U.S. Patent No. 7,857,332 was wanton, willful, and/or reckless, and constitutes an exceptional case.

26. Upon information and belief, the First Product, the Second product, and the Third Product are cheap and inferior knock-offs of plaintiff's Genuine Product.

27. Defendant's infringement of U.S. Patent No. 7,857,332 has caused plaintiff irreparable harm to its patent rights and Marks.

28. Defendant's infringement of U.S. Patent No. 7,857,332 has caused plaintiff monetary damage as a result of lost sales of the Genuine Product and harm to the reputation and good-will of plaintiff and its Marks.

COUNT II - PATENT INFRINGEMENT - U.S. PATENT NO. 8,267,413

29. Plaintiff re-alleges each and every allegation set forth in Paragraphs 1-28 of this Complaint as if fully alleged herein.

30. Defendant's import, use, advertising offer for sale, and/or sale of the First Product, the Second product, and/or the Third Product infringes U.S. Patent No. 8,267,413 in violation of 35 U.S.C. §271.

31. Upon information and belief, defendant's infringement of U.S. Patent No. 8,267,413 was and continues to be wanton, willful, and/or reckless and constitutes

an exceptional case.

32. Defendant's infringement of U.S. Patent No. 8,267,413 has caused and continues to cause plaintiff irreparable harm to its patent right and the Marks.

33. Defendant's infringement of U.S. Patent No. 8,267,413 has caused and continues to cause plaintiff monetary damage as a result of lost sales of the Genuine Product and harm to the reputation and good-will of plaintiff and its Marks.

COUNT III - PATENT INFRINGEMENT - U.S. PATENT NO. D602,408

34. Plaintiff re-alleges each and every allegation set forth in Paragraphs 1-33 as if fully alleged herein.

35. Defendant's import, use, advertising, offer for sale, and/or sale of the First Product, the Second product, and/or the Third Product infringes U.S. Patent No. D602,408 in violation of 35 U.S.C. §271.

36. Upon information and belief, defendant's infringement of U.S. Patent No. D602,408 was and continues to be wanton, willful, and/or reckless and constitutes an exceptional case.

37. Defendant's infringement of U.S. Patent No. D602,408 has caused and continues to cause plaintiff irreparable harm to its patent right and the Marks.

38. Defendant's infringement of U.S. Patent No. D602,408 has caused and continues to cause Plaintiff monetary damage as a result of lost sales of the Genuine

Product and harm to the reputation and good-will of plaintiff and its Marks.

COUNT IV - PATENT INFRINGEMENT - U.S. PATENT NO. D624,460

39. Plaintiff re-alleges each and every allegation set forth in Paragraphs 1-38 of this Complaint as if fully alleged herein.

40. Defendant's import, use, advertising, offer for sale, and/or sale of the Third Product infringes U.S. Patent No. D624,460 in violation of 35 U.S.C. §271.

41. Defendant's infringement of U.S. Patent No. D624,460 has caused and continues to cause plaintiff irreparable harm to its patent right and the Marks.

42. Defendant's infringement of U.S. Patent No. D624,460 has caused and continues to cause Plaintiff monetary damage as a result of lost sales of the Genuine Product and harm to the reputation and good-will of plaintiff and its Marks.

COUNT V - PATENT INFRINGEMENT - U.S. PATENT NO. D624,855

43. Plaintiff re-alleges each and every allegation set forth in Paragraphs 1-42 of this Complaint as if fully alleged herein.

44. Defendant's manufacture, import, use, offer for sale, and/or sale of the Third Product infringes U.S. Patent No. D624,855 in violation of 35 U.S.C. §271.

45. Defendant's infringement of U.S. Patent No. D624,855 has caused and continues to cause plaintiff irreparable harm to its patent right and the Marks.

46. Defendant's infringement of U.S. Patent No. D624,855 has caused and

continues to cause Plaintiff monetary damage as a result of lost sales of the Genuine Product and harm to the reputation and good-will of plaintiff and its Marks.

COUNT VI - UNFAIR BUSINESS PRACTICES (CAL. CIVIL CODE §17203)

47. Plaintiff re-alleges each and every allegation set forth in Paragraphs 1-46 as if fully alleged herein.

48. Plaintiff's infringement of U.S. Patent Nos. 8,267,413; 7,857,332; D602,408; D624,460; and/or D624,855 by importing, using, advertising, and/or selling of the First Product, the Second product, and/or the Third Product constitutes unfair business practices in violation of California Civil Code §17203.

49. Upon information and belief, defendant's unfair business practices were and continue to be wanton, reckless and/or willful.

50. Defendant's unfair business practices has caused and continues to cause plaintiff irreparable harm to its patent rights and to the good-will plaintiff has established in the Marks.

51. Defendant's unfair business practices has caused and continues to cause plaintiff monetary damage as a result of lost sales of the Genuine Product and harm to the reputation and good-will of plaintiff and its Marks.

REQUESTED RELIEF

Plaintiff requests this Court to enter judgment in its favor against defendant, DNA Motor Inc., on all of the above counts and grant it the following relief:

1. Pursuant to 35 U.S.C. §283, an order that defendant be preliminary enjoined from making, importing, using, shipping, offering for sale, and/or selling the First Product, the Second Product, and/or the Third Product and/or any other product that infringes U.S. Patent Nos. 8,267,413; D602,408; D624,460; and/or D624,855;

2. Pursuant to 35 U.S.C. §283, an order that defendant be permanently enjoined from making, importing, using, shipping, offering for sale, and/or selling the First Product, the Second Product, and/or the Third Product and/or any other product that infringes U.S. Patent Nos. 8,267,413; D602,408; D624,460; and/or D624,855;

3. Pursuant to 35 U.S.C. §284 and §17203, an order that defendant pay plaintiff actual damages caused by defendant's marketing and sale of the First Product, the Second Product, and/or the Third Product as may be proved at trial, and in no event less than a reasonable royalty;

4. Pursuant to 35 U.S.C. §284, an order that actual damages be trebled;

5. Pursuant to 35 U.S.C. §289 and §17203, an order that defendant pay plaintiff damages equal to the profits realized by the defendant's sale of the First Product, the Second Product, and/or the Third Product as may be proved at trial;

6. An order that defendant deliver to plaintiff for destruction all inventory of the First Product, the Second Product, and/or the Third Product in its possession,

custody, and/or control;

7. Pursuant to 35 U.S.C. §284, an order that plaintiff be awarded interest on damages;

8. Pursuant to 35 U.S.C. §284, an order that plaintiff be awarded its costs;

9. Pursuant to 35 U.S.C. §285 and §17203, an order that plaintiff be awarded its reasonable attorney fees; and

10. Such other relief as this Court deems equitable and just.

REQUEST FOR A JURY

Plaintiff requests a jury on all issues triable by a jury.

Respectfully submitted,

Dated: 04-01-2015

By: /s/ Gene H. Shioda
Gene H. Shioda (SBN #186780)
ghs@shiodakim.com
Attorney For Group-A Autosports, Inc.

CERTIFICATE OF SERVICE

I hereby certify that a true copy of the above document was filed through the ECF system and will be sent electronically to registered participants as identified on the Notice of Electronic Filing, and paper copies will be sent by first class mail, postage pre-paid, and by e-mail, to those indicated as non-registered participants on April 01, 2015, as follows:

/s/Gene H. Shioda
Gene H. Shioda

EXHIBIT A - U.S. PATENT NO. 8,267,413

US008267413B1

(12) **United States Patent**
Hsu

(10) **Patent No.: US 8,267,413 B1**
(45) **Date of Patent: *Sep. 18, 2012**

(54) **CAMBER ARM AND BALL JOINT ASSEMBLY**

(75) Inventor: **David Hsu**, Norco, CA (US)

(73) Assignee: **Group-A Autosports, Inc.**, Norco, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 30 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/898,866**

(22) Filed: **Oct. 6, 2010**

Related U.S. Application Data

(63) Continuation of application No. 12/234,287, filed on Sep. 19, 2008, now Pat. No. 7,857,332.

(51) **Int. Cl.**
B62D 17/00 (2006.01)

(52) **U.S. Cl.** **280/86.757**; 280/86.751

(58) **Field of Classification Search** 280/5.521, 280/86.751, 86.757

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,857,332 B2 * 12/2010 Hsu 280/86.757

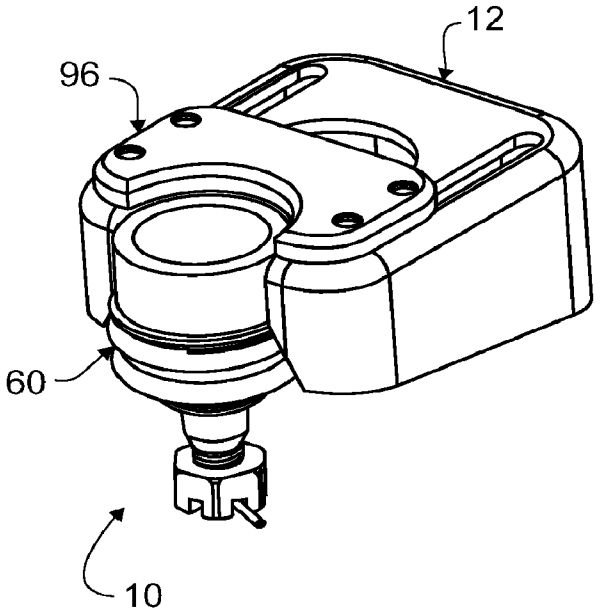
* cited by examiner

Primary Examiner — Paul N Dickson
Assistant Examiner — Laura Freedman
(74) *Attorney, Agent, or Firm* — Steven N. Fox, Esq.

(57) **ABSTRACT**

The present invention is a device for adjusting the camber angle of a tire/wheel assembly of a vehicle. The device comprises a camber arm having a cage. The cage comprises a cavity and front and top walls. The top wall comprises first and second slots. The cage further comprising a cut-out extending along the front and top walls. The device further comprises a ball joint assembly adjustably engaged with the cage. The device further comprises a fastener for securing the upper clamping plate to the lower clamping plate of the ball joint assembly. The ball joint assembly is adjustably moved along the first and second slots of the cage from a first position where the outward portion of the ball joint housing is disposed outside of the cavity of the cage and a second position where the outward portion of the ball joint housing is disposed within the cavity.

19 Claims, 15 Drawing Sheets



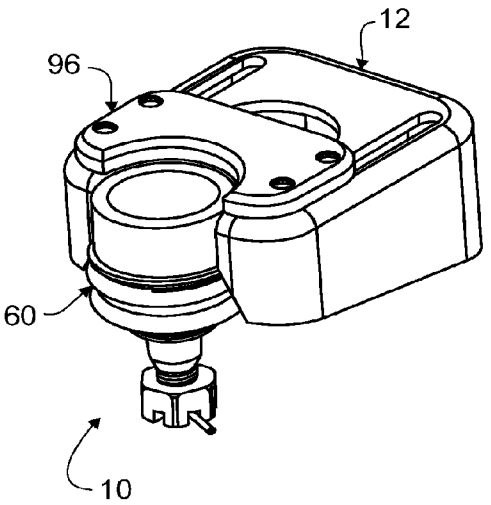


FIG. 1

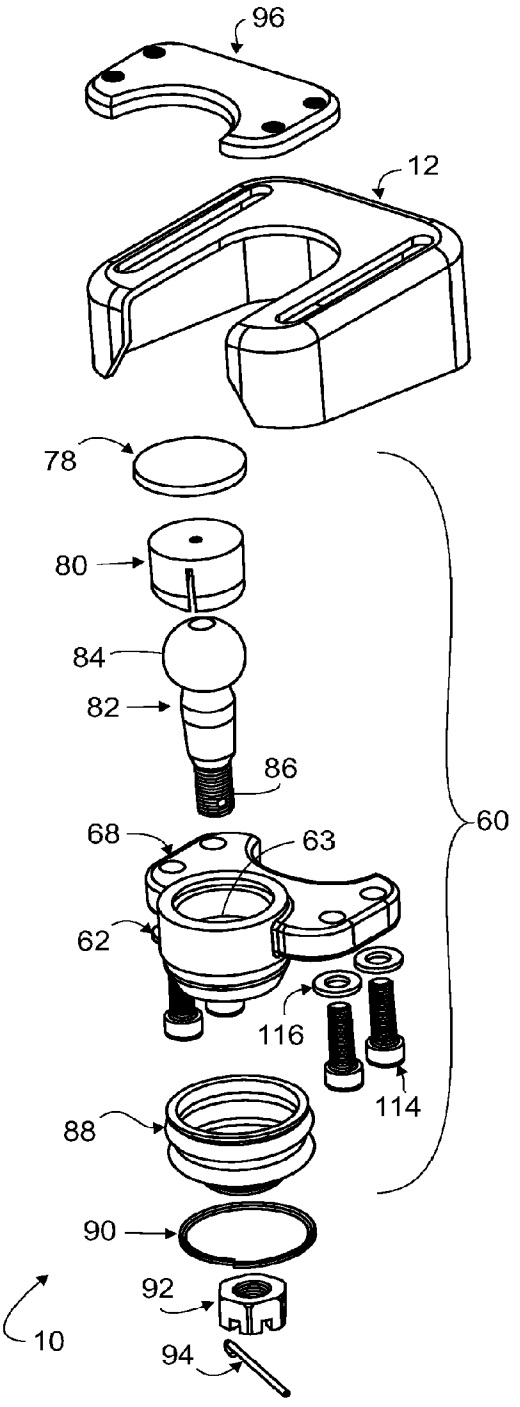


FIG. 2

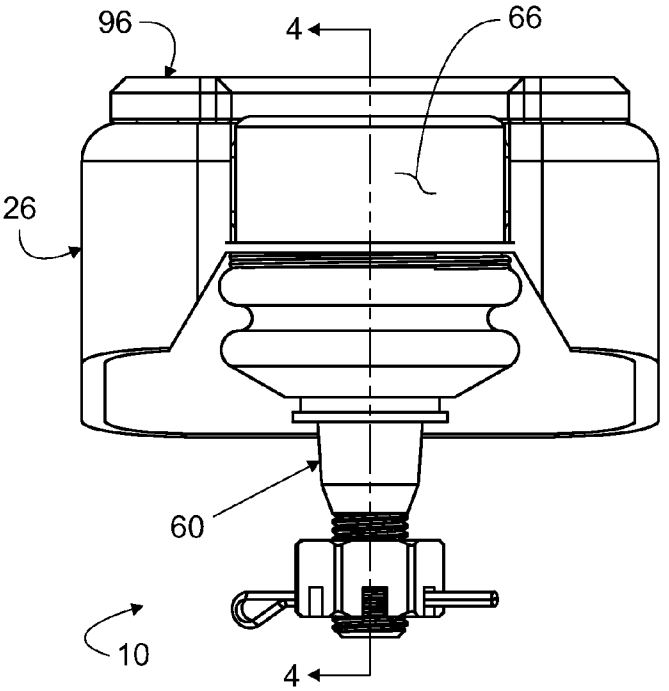


FIG. 3

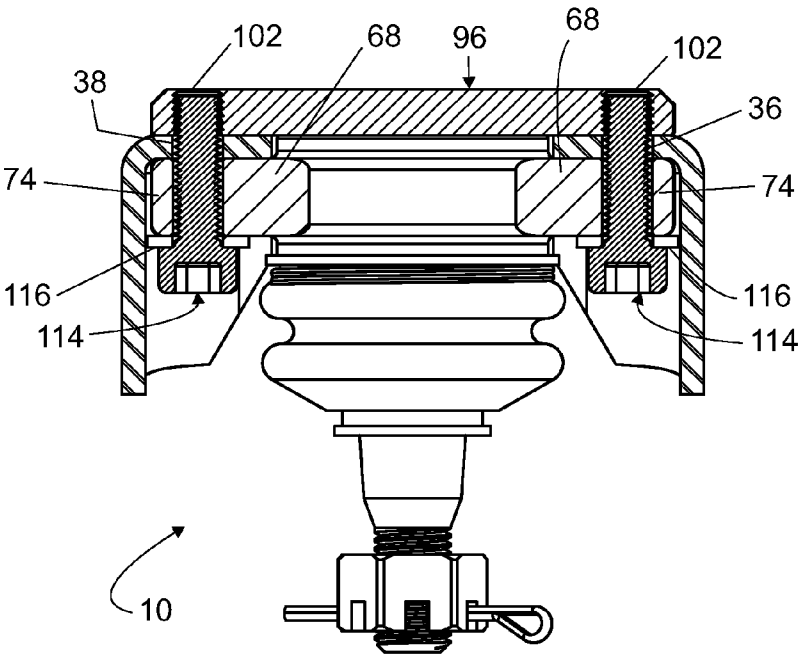


FIG. 5

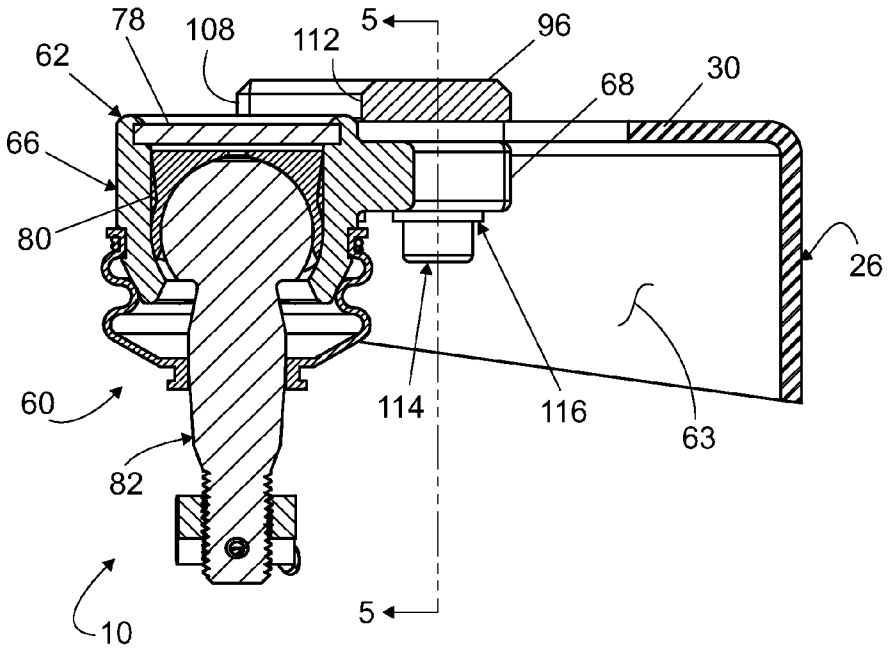


FIG. 4A

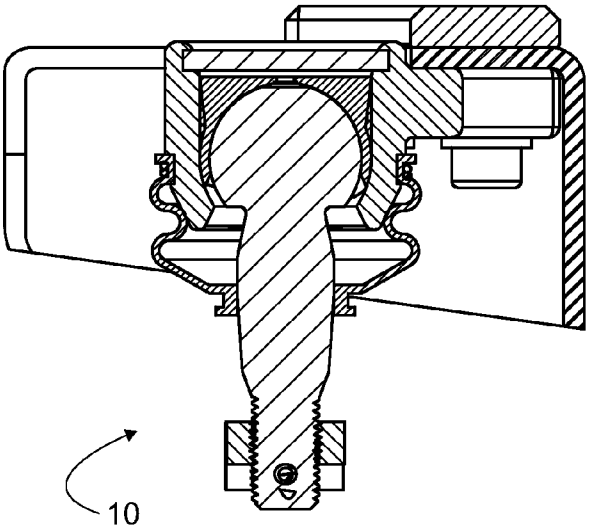


FIG. 4B

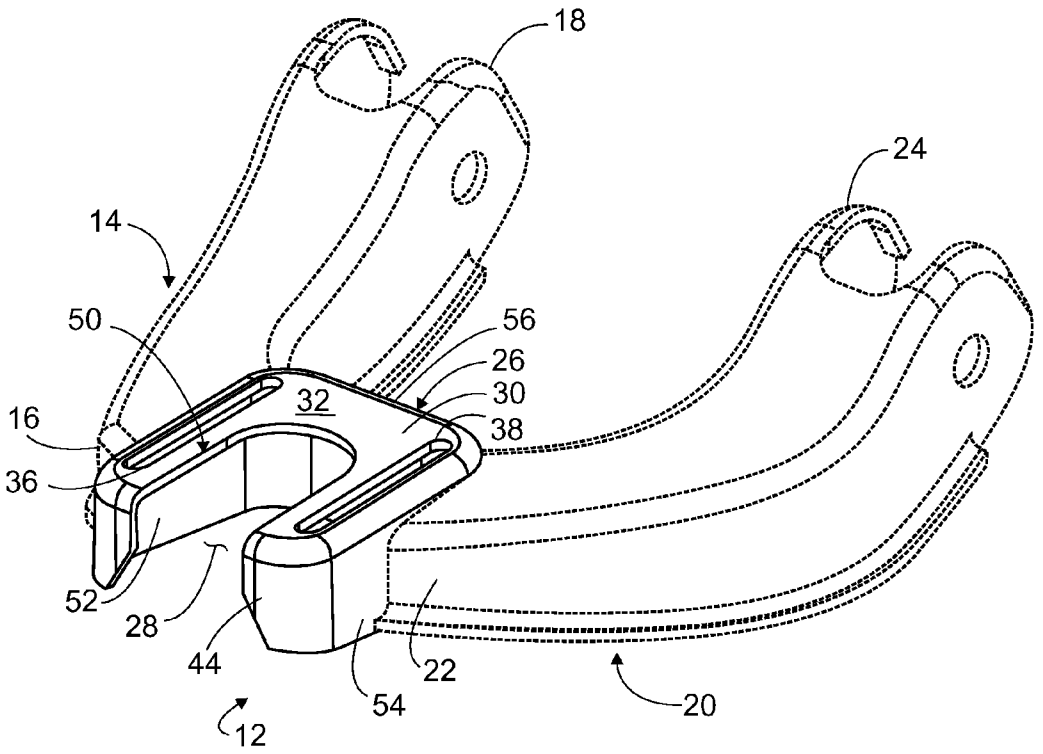


FIG. 6

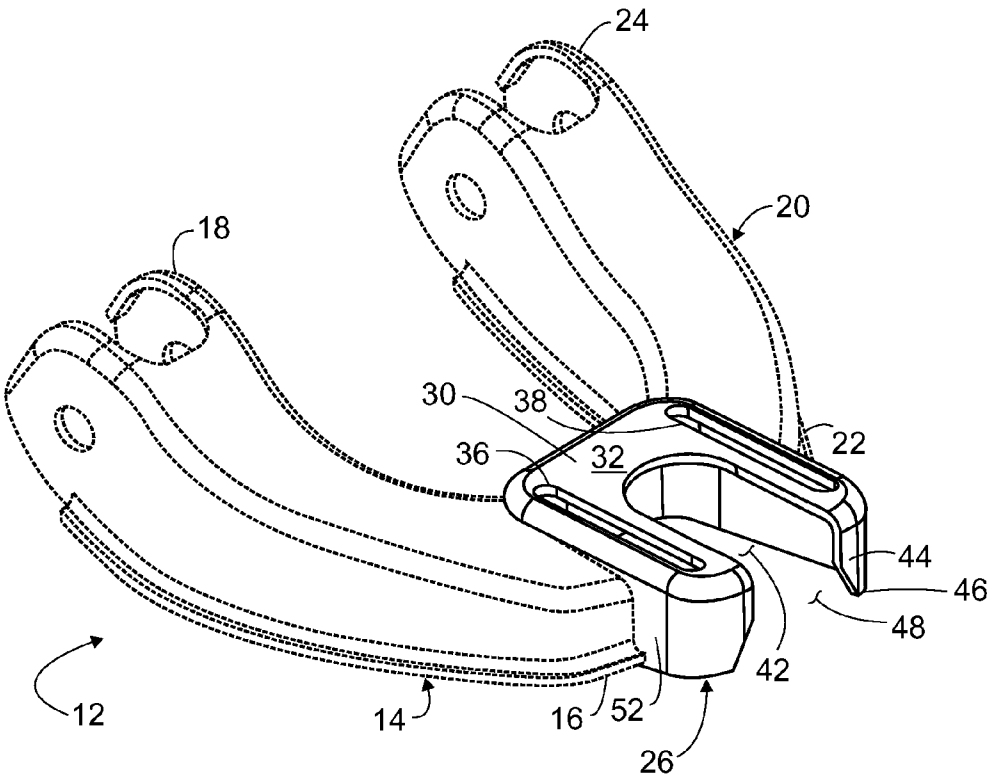


FIG. 7

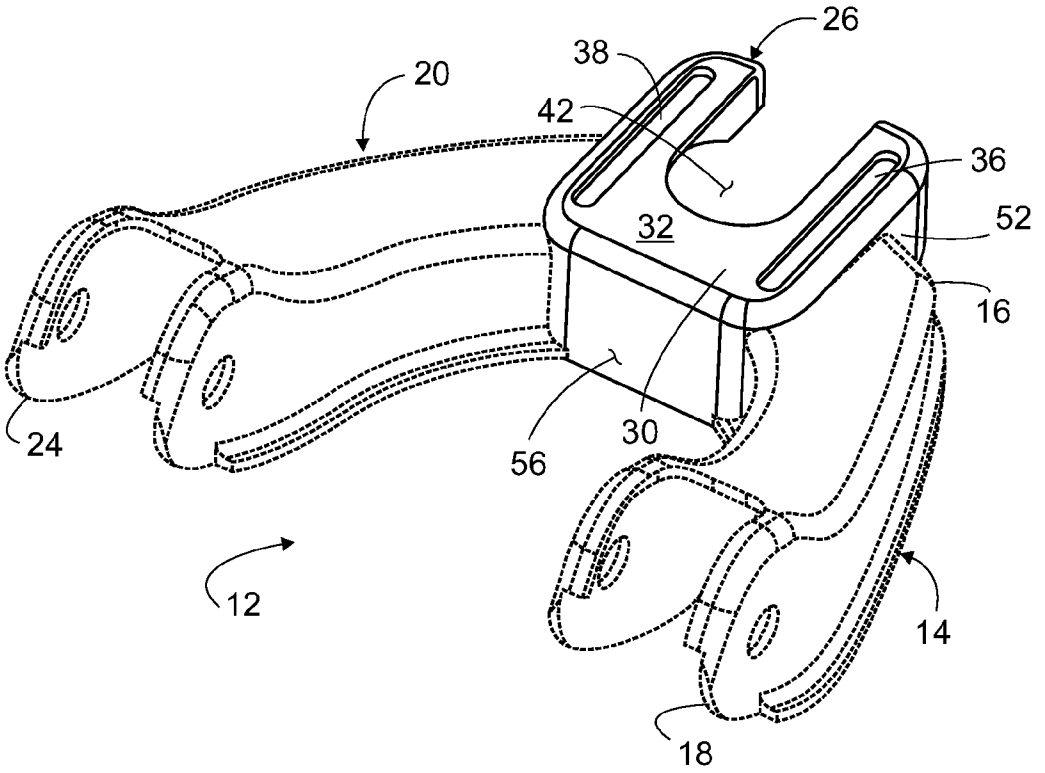


FIG. 8

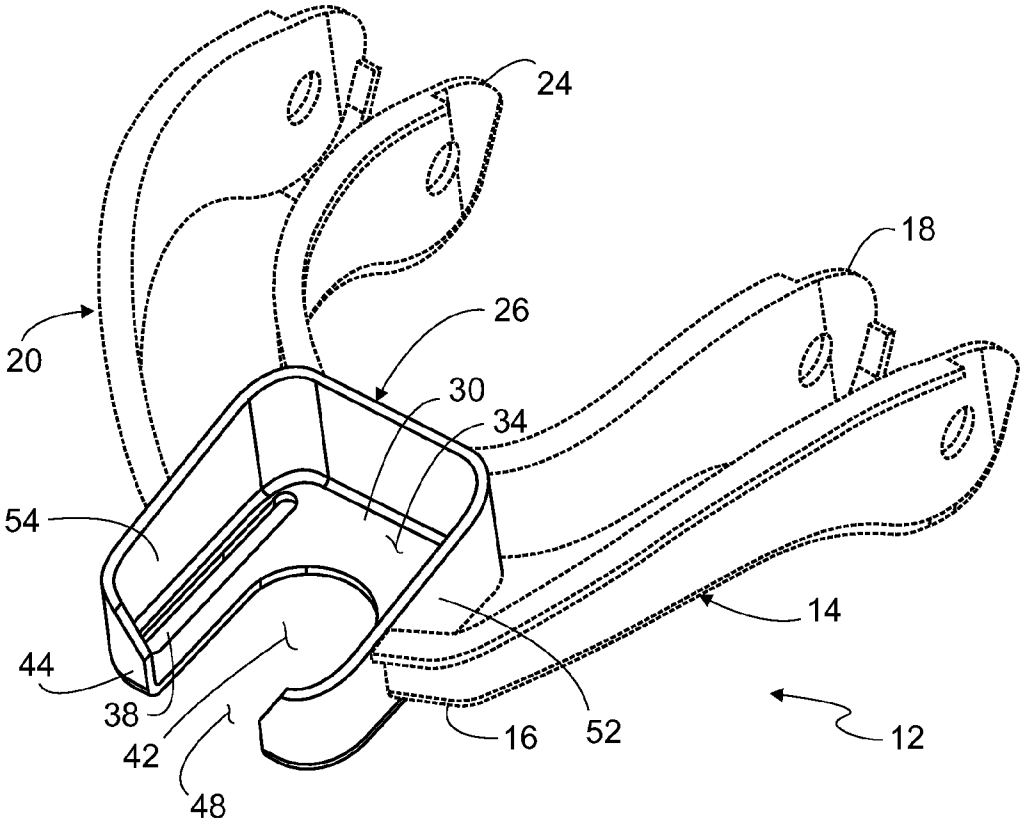


FIG. 9

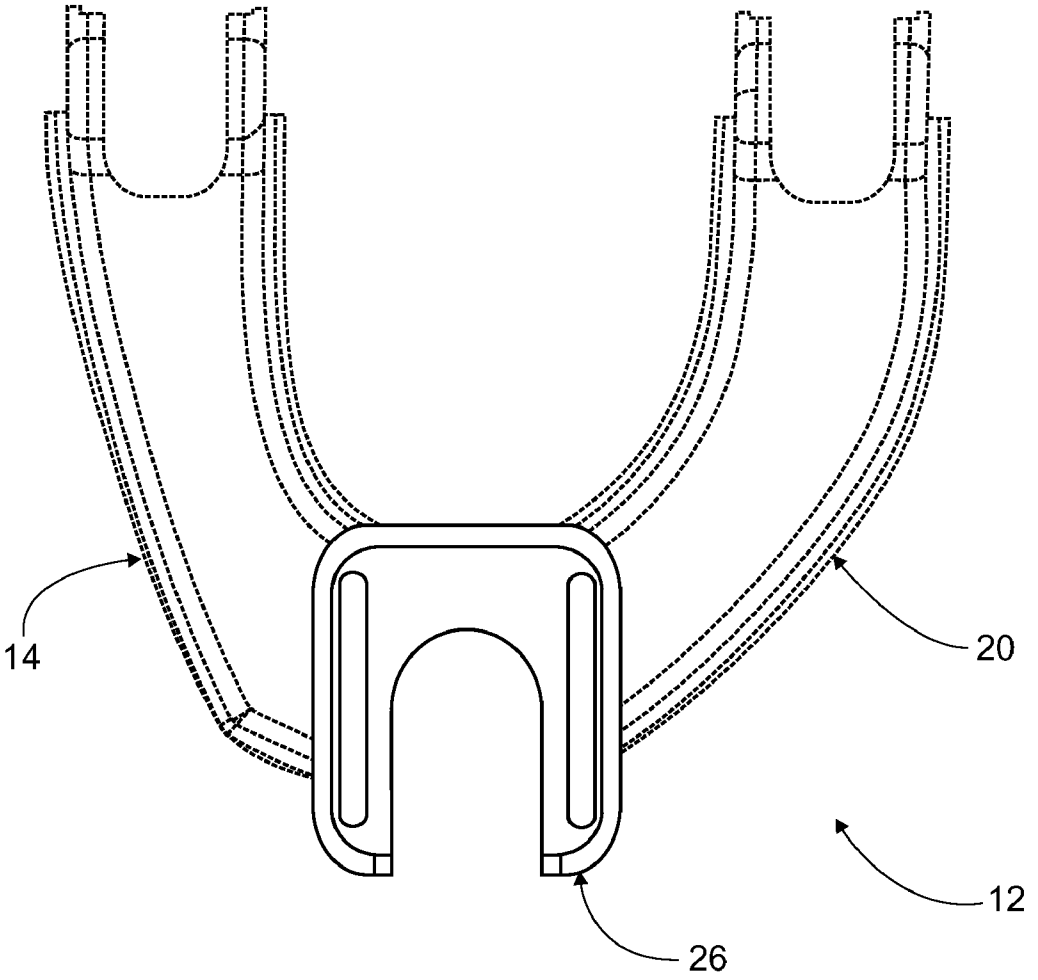
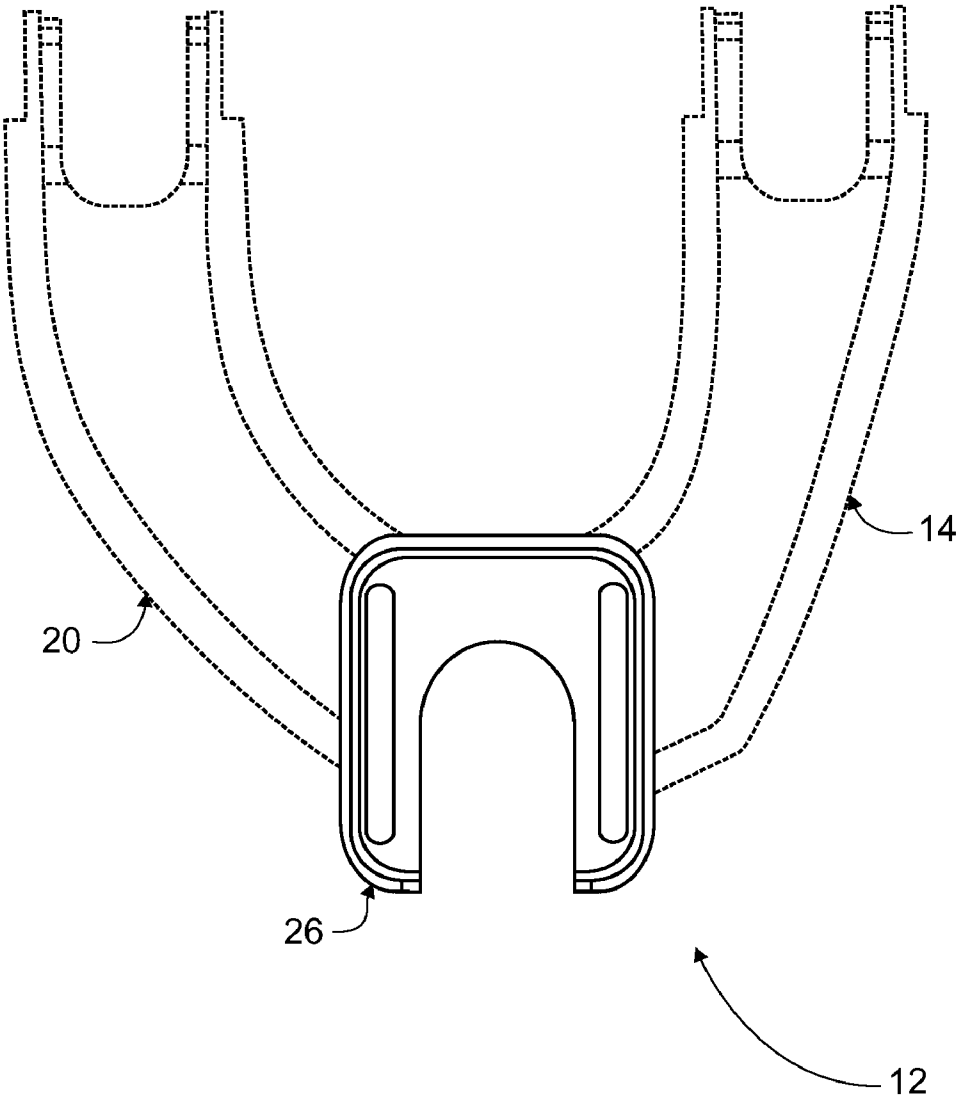


FIG. 10



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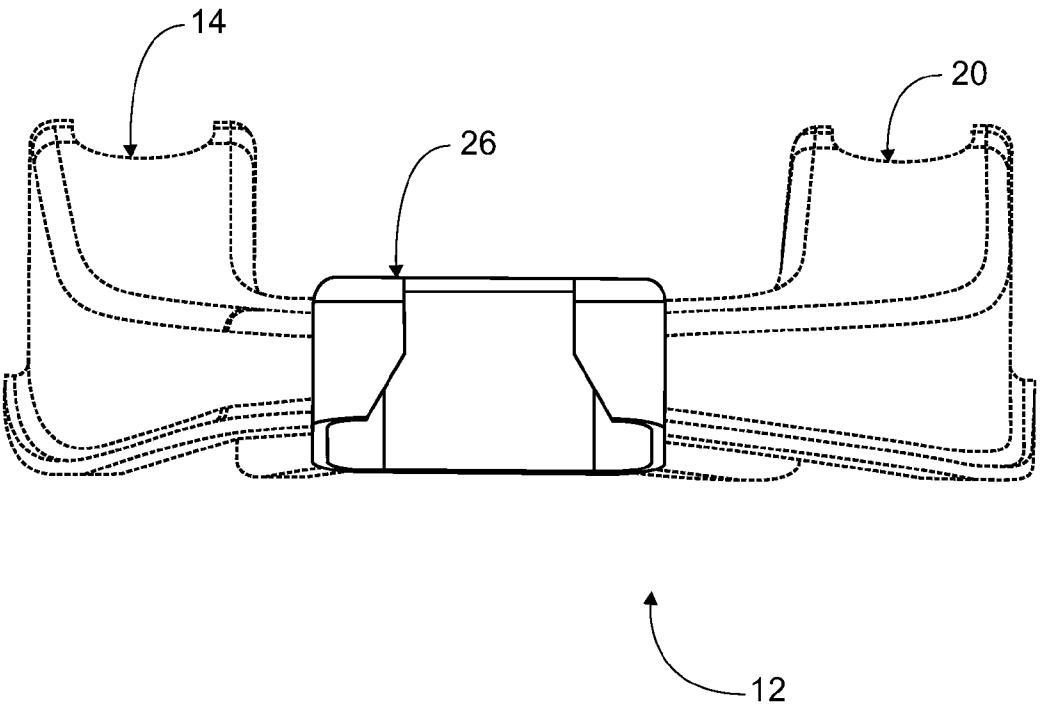

FIG. 12

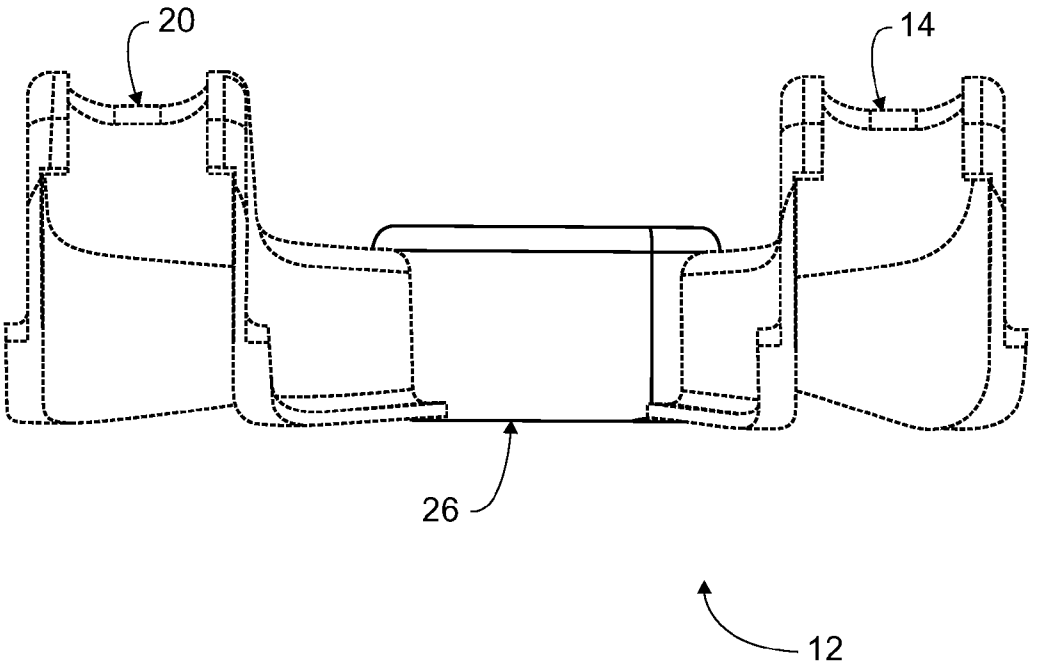

FIG. 13

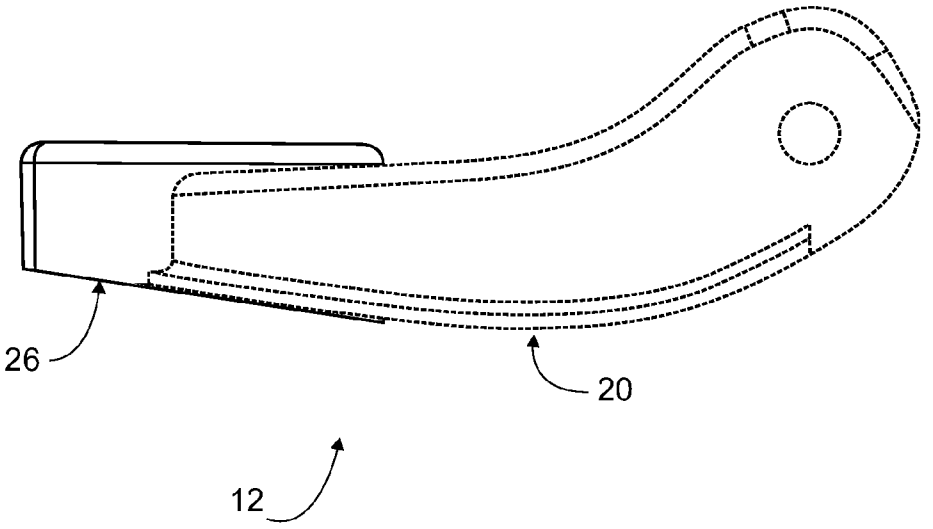

FIG. 14

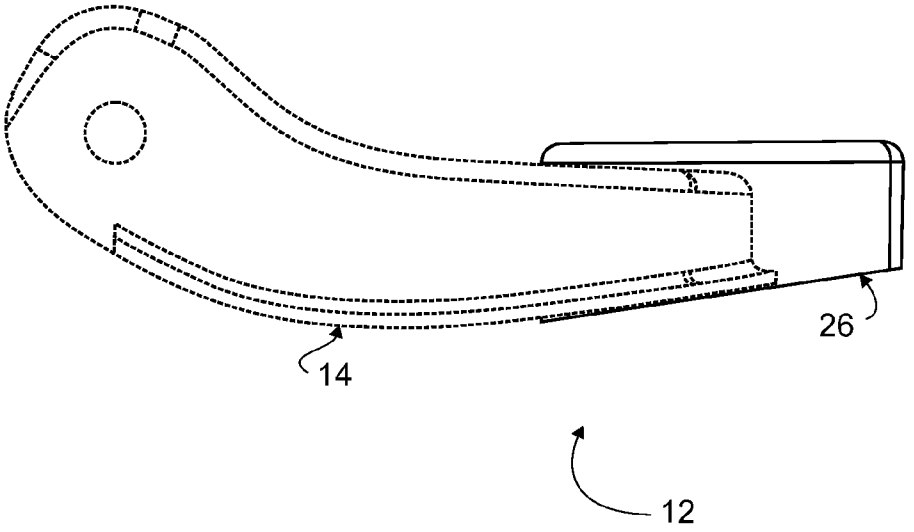

FIG. 15

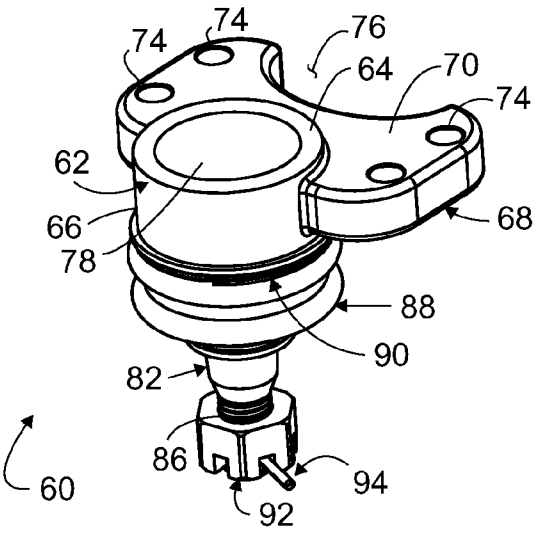
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FIG. 16

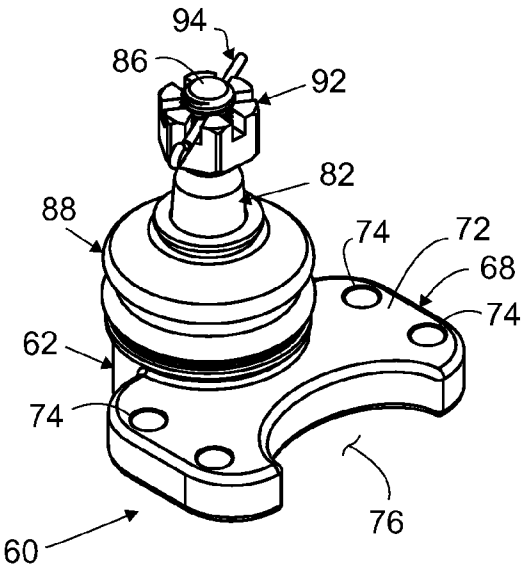
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FIG. 17

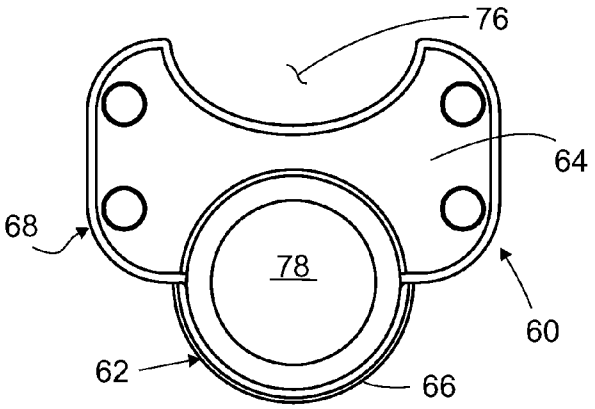


FIG. 18

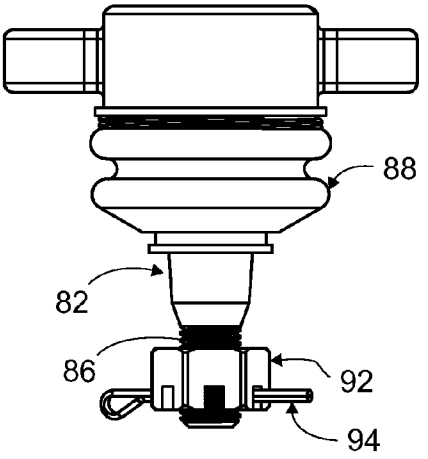


FIG. 19

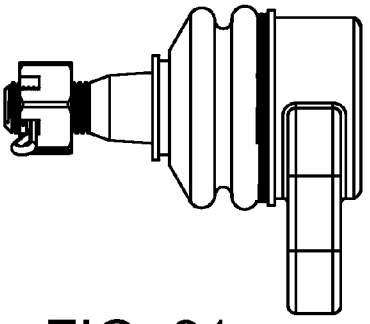


FIG. 21

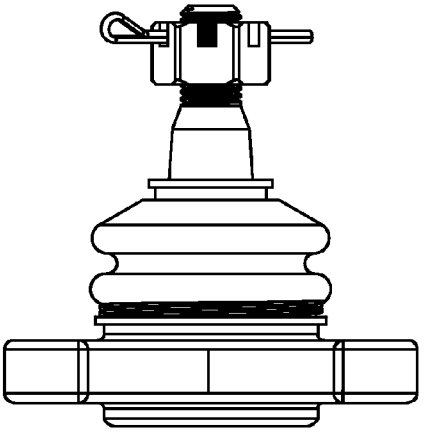


FIG. 20

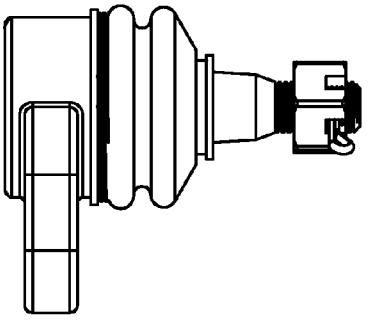


FIG. 22

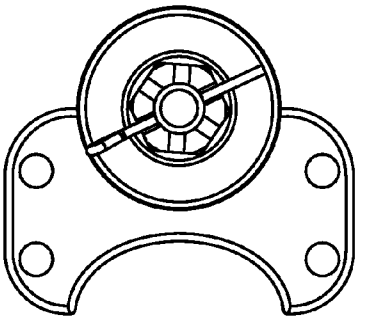


FIG. 23

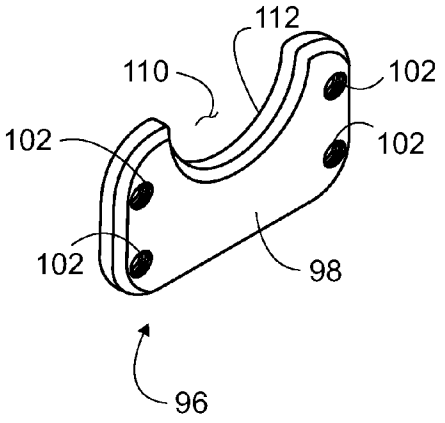


FIG. 24

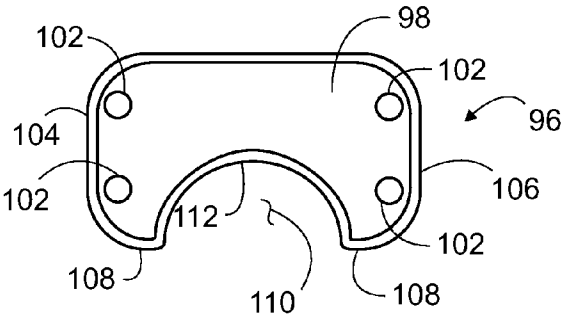


FIG. 25

FIG. 26

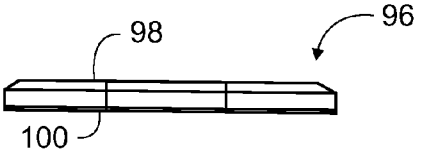


FIG. 27

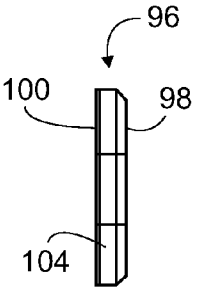


FIG. 28

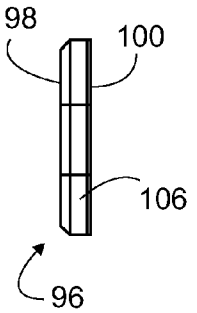


FIG. 29

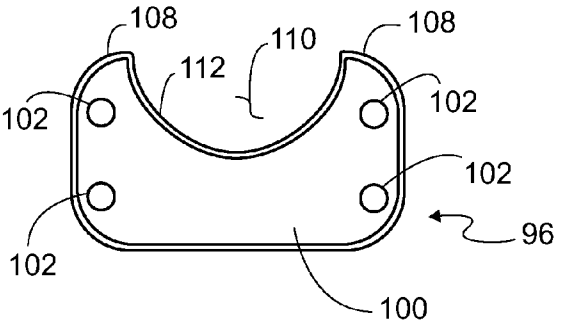


FIG. 30

CAMBER ARM AND BALL JOINT ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of application Ser. No. 12/234,287 filed on Sep. 19, 2008, now pending, which is hereby incorporated by reference in its entirety into this specification.

BACKGROUND OF THE INVENTION

A camber arm is used to adjust the camber angle of a tire/wheel assembly of a vehicle. The camber angle is the inward or outward tilt of the tire/wheel assembly and is measured from a true vertical line perpendicular to the ground. A tire/wheel assembly that is tilted outward at the top is considered to have positive camber. In contrast, a tire/wheel assembly tilted inward at the top is considered to have negative camber. For a zero setting, the tire/wheel assembly is in an exact vertical position or perpendicular to the ground. Positive camber results in a dynamic loading that allows the tire to run relatively flat against the road surface. Positive camber directs the weight and shock load of the vehicle on the larger inner wheel bearing and inboard portion of the spindle rather than the outboard bearing. A moderate positive camber results in longer bearing life, less likely sudden load failure, and easier steering. Excessive positive camber wears the outside of the tire and may cause wear to suspension pans such as wheel bearings and spindles. Negative camber on be used to improve the handling of a vehicle. A setting of ½° negative on both sides of a street car will improve cornering without affecting tire life greatly. This negative setting compensates for the slight positive camber change of the outside tire due to vehicle roll, thereby allowing a flatter tire contact patch during cornering. Excessive negative camber wears the inside of the tire and can cause wear and stress on suspension parts. Conventional devices do not allow the camber angle to be adjusted between a satisfactory range of positive and negative camber angles without failure under severe dynamic loads.

SUMMARY OF THE INVENTION

One object of the present invention is to provide a camber arm that allows the camber angle to be adjusted between a wider range of positive and negative camber angles without failure under severe dynamic loads.

The present invention is a device for adjusting the camber angle of a tire/wheel assembly of a vehicle. In one embodiment, the device comprises a camber arm having first and second arms and a cage. The cage comprises a cavity, a top wall, a front wall, and first and second sidewalls. The first and second arms are connected to the first and second sidewalls of the cage. The top wall comprises an outside surface, an inside surface, and first and second slots. The cage further comprising a cut-out extending along the front and top walls. The device further comprises a ball joint assembly adjustably engaged with the cage. The ball joint assembly comprises a ball joint housing and a lower clamping plate that is adjustably fastened to the inside surface of the top wall. The ball joint housing has an outward portion and an inward portion. The device further comprises an upper clamping plate having an outside surface, an inside surface, a plurality of mounting holes, a front edge portion, first and second side edge portions, and a cut-out having an inner edge portion. The cut-out extends inward from the front edge portion to the inner edge portion to allow access to the ball joint housing when assembled. The device further comprises a plurality of bolts for fastening the upper clamping plate and the lower clamping plate of the ball joint assembly to the top wall of the cage. The ball joint assembly may be adjustably moved within the first and second slots from a first position where the outward portion of the ball joint housing is disposed outside of the cavity of the cage and a second position where the outward portion of the ball joint housing is disposed within the cavity of the cage.

BRIEF DESCRIPTION OF THE DRAWINGS

The following detailed description of the invention will more fully understood with reference to the accompanying drawings wherein:

FIG. **1** is a perspective view of a camber arm assembly according to the present invention shown without left and right camber arms;

FIG. **2** is an exploded view of the camber arm assembly;

FIG. **3** is a front elevation view of the camber arm assembly;

FIG. **4**A is a cross-section view taken along line **4**-**4** of FIG. **3** showing the outward portion of the ball joint housing disposed outward of the cavity of the cage;

FIG. **4**B is a cross-section view taken along line **4**-**4** of FIG. **3** showing the outward portion of the ball joint housing disposed within the cavity of the cage;

FIG. **5** is a cross-section view taken along line **5**-**5** of FIG. **4**-A;

FIGS. **6** and **7** are top front perspective views of the camber arm;

FIG. **8** is a top rear perspective view of the camber arm;

FIG. **9** is a bottom front perspective view of the camber arm;

FIG. **10** is a top plan view of the camber arm;

FIG. **11** is a bottom plan view of the camber arm;

FIG. **12** is a front elevation view of the camber arm;

FIG. **13** is a rear elevation view of the camber arm;

FIG. **14** is a left side elevation view of the camber arm;

FIG. **15** is a right side elevation view of the camber arm;

FIG. **16** is a top perspective view of a ball joint assembly according to the present invention;

FIG. **17** is a bottom perspective view of the ball joint assembly;

FIG. **18** is a top plan view of the ball joint assembly;

FIG. **19** is a front elevation view of the ball joint assembly;

FIG. **20** is a rear elevation view of the ball joint assembly;

FIG. **21** is a left side elevation view of the ball joint assembly;

FIG. **22** is a right side elevation view of the ball joint assembly;

FIG. **23** is a bottom plan view of the ball joint assembly;

FIG. **24** is a top perspective view of an upper clamping plate according to the present invention;

FIG. **25** is a top plan view of the upper clamping plate;

FIG. **26** is a front elevation view of the upper clamping plate;

FIG. **27** is a rear elevation view of the upper clamping plate;

FIG. **28** is a left side elevation view of the upper clamping plate;

FIG. **29** is a right side elevation view of the upper clamping plate; and

FIG. **30** is a bottom plan view of the upper clamping plate.

DESCRIPTION OF THE INVENTION

Referring to FIGS. **1**-**2**, the present invention is a device **10** for adjusting the camber angle of a tire/wheel assembly (not

shown) of a vehicle. In one embodiment, device **10** generally comprises a camber arm assembly **12**, a ball joint assembly **60**, and an upper clamping plate **96**. For ease of illustration, left and right arms **14** and **20** (to be described) are not shown. Ball joint assembly **60** may be adjustably positioned on camber arm assembly **12** and secured thereto by upper clamping plate **96** and bolts **114** and washers **116**.

Referring to FIGS. **6-15**, camber arm assembly **12** generally comprises left and right arms **14** and **20**, and a central cage **26**. Left arm **14** generally comprises a first end portion **16** and a second end portion **18**. Right arm **20** generally comprises a first end portion **22** and a second end portion **24**. Cage **26** generally comprises a cavity **28**, a top wall **30**, a front wall **44**, first and second sidewalk **52** and **54**, and a rear wall **56**. Cage **26** further comprises a large cut-out **50** formed by a cut-out **42** (to be described) along top wall **30** and a cut-out **48** (to be described) along front wall **44**. Second end portions **18** and **24** of first and second arms **14** and **20** are adapted for connection to the chassis frame (not shown) of the vehicle. In the embodiment shown, end portions **16** and **22** of first and second arms **14** and **20** are secured to left and right sidewalls **52** and **54** (to be described) of cage **26**, respectively, by conventional means such as welding. Arms **14** and **20** may be of any desired shape and configuration based upon the chassis frame or other vehicle specifications. Top wall **30** of cage **26** comprises an outside surface **32**, an inside surface **34**, and first and second slots **36** and **38**; and a cut-out **42**. First and second slots **36** and **38** receive bolts **114** so that upper clamping plate **96** and lower clamping plate **68** of ball joint assembly **60** may be adjustably secured to and along top wall **30** of cage **26** by sliding the assembly within slots **36** and **38**. Front wall **44** comprises a bottom edge **46** and a cut-out **48**. Arms **14** and **20**, and cage **26** are made from steel and fabricated by conventional stamping and machining operations.

Referring to FIGS. **2** and **16-23**, ball joint assembly **60** comprises a ball joint housing **62** having a cavity **63**, an inward portion **64**, and an outward portion **66**. Ball joint assembly **60** further comprises a lower clamping plate **68** extending outward from inward portion **64**. Lower clamping plate **68** comprises an upper surface **70**, a lower surface **72**, mounting holes **74**, and a cut-out **76**. In the embodiment shown, mounting holes **74** are clearance holes to receive bolts **114** which are then threaded into mounting holes **102** (to be described) of upper clamping plate **96**. In other embodiments, mounting holes **74** may be threaded holes and mounting holes **102** (to be described) of upper clamping plate **96** may be clearance holes wherein bolts **114** would be inserted into clearance holes **102** (to be described) and then threaded into mounting holes **74**. Housing **62** and lower clamping plate **68** are made from steel and fabricated as a single cast piece by conventional casting and machining operations. As best shown by FIG. **2**, ball joint assembly **60** further comprises a ball joint **82** having a ball portion **84** and a threaded end portion **86**. Ball joint assembly **60** further comprises a plastic sleeve **80** and a housing cover **78**. Sleeve **80** is disposed about ball portion **84** of ball joint **82** and inserted within cavity **63** of ball joint housing **62** such that threaded end portion **86** extends downward out of cavity **63**. Cover **78** is removably engaged with ball joint housing **62** by a force-fit to enclose cavity **63**. Ball joint **82**, sleeve **80**, and housing cover **78** are well known in the industry and widely available. Ball joint assembly **60** further comprises a rubber dust boot **88** to prevent dust or other contamination from entering cavity **63** of ball joint housing **62**. Dust boot **88** is well known in the industry and widely available. Ball joint assembly **60** further comprises a locking ring **90** to retain dust boot **88** about ball joint housing **62**. Locking ring **90** is well known in the industry and widely available. Ball joint assembly **60** further comprises a castle nut **92** and a locking pin **94** to prevent the spindle or steering knuckle (not shown) from being disengaged from ball joint **82**. Nut **92** and locking pin **94** are well known in the industry and widely available.

Referring to FIGS. **24-30**, upper clamping plate **96** comprises an upper surface **98**, a lower surface **100**, and a plurality of threaded mounting holes **102** extending from upper surface **98** to lower surface **100**. Upper clamping plate **96** further comprises side edges portions **104** and **106**, a front edge portion **108**, and a cut-out **110** having an inner edge portion **112**. Cut-out **110** extends inward from front edge portion **108** to inner edge portion **112** to allow access to cover **78** of ball joint housing **62** when assembled. Upon assembly of upper clamping plate **96** to lower clamping, plate **68** of ball joint assembly **60**, inner edge portion **112** is substantially aligned and/or immediately adjacent or juxtaposed to inward portion of **64** of ball joint housing **62** thereby allowing a person access to cover **78** and cavity **63** to repair or replace ball joint **82** and/or sleeve **80**. Upper clamping plate **96** is made from steel and fabricated by conventional machining operations.

Referring to FIGS. **3-5**, bolts **114** and washers **116** securely fasten upper clamping plate **96** and lower clamping plate **68** of ball joint assembly **60** to top wall **30** of cage **26**. In the embodiment shown, lower surface **100** of upper clamping plate **95** is engaged with outside surface **32** of top wall **30** of cage **26**, and upper surface **70** of lowering clamping plate **68** of ball joint assembly **60** is engaged with inside surface **34** of to wall **30** of cage **26**. Alternatively, lower surface **72** of lowering clamping plate **68** of ball joint assembly **60** may be engaged with outside surface **32** of top wall **30** of cage **26**, and upper surface **98** of upper clamping plate **96** may be engaged with inside surface **34**, of top wall **30** of cage **26**. In either fastening configuration, ball joint assembly **60** may be adjustably moved anywhere between a first position where outward portion **66** of ball joint housing **62** is disposed outside of cavity **63** (FIG. **4**A) and a second position where outward portion **66** of ball joint housing **62** is disposed within cavity **63** (FIG. **4**B). As described heretofore, mounting holes **74** of lower clamping plate **68** are clearance holes to receive or allow passage of bolts **114** which are then inserted thru slots **36** and **38** of cage **26**, and then threaded into threaded mounting holes **102** of upper clamping plate **96**. In other embodiments, mounting holes **74** may be threaded holes and mounting holes **102** of upper clamping plate **96** may be clearance holes wherein bolts **114** would be inserted into clearance holes **102** and then threaded into mounting holes **74**.

The foregoing description is intended for purposes of illustration. The invention may be embodied in other forms or carried out in other ways without departing from the spirit or scope of the invention.

What is claimed:

1. A device for adjusting a camber angle of a tire/wheel assembly of a vehicle comprising:

a camber arm comprising a cage; said cage comprises a cavity, a top wall, a front wall, and first and second sidewalls; said top wall comprises an outside surface, an inside surface, and first and second slot portions; said cage further comprises a cut-out extending along said front and top walls;

a ball joint assembly adjustably engaged with said cage; said ball joint assembly comprising a ball joint housing having a centerline and a lower clamping plate; said ball joint housing having an outward portion and an inward portion;

an upper clamping plate;

a fastener for removably attaching said upper clamping plate and said lower clamping plate of said ball joint assembly to said top wall of said cage; and

whereby said ball joint assembly may be adjustably moved from a first position where said outward portion of said ball joint housing is disposed outside of said cavity to a second position where said outward portion of said ball joint housing is disposed within said cavity.

2. The device of claim **1**, wherein said cut-out of said cage extends substantially along said front and top walls.

3. The device of claim **2**, wherein said lower clamping plate comprising an upper surface, a lower surface, and a plurality of mounting holes.

4. The device of claim **3**, wherein said upper clamping plate comprises an upper surface, a lower surface, a plurality of mounting holes, a front edge portion, and a cut-out having an inner edge portion; said cut-out extending inward from said front edge portion to said inner edge portion to allow access to said ball joint housing when assembled.

5. The device of claim **4**, wherein said lower surface of said upper clamping plate is engaged with an outside surface of said top wall of said cage.

6. The device of claim **5**, wherein said upper surface of said lower clamping plate of said ball joint assembly is engaged with an inside surface of said top wall of said cage.

7. The device of claim **6**, wherein said cut-out of said cage is centrally disposed along said front and top walls of said cage.

8. The device of claim **7**, wherein said cut-out of said cage extends the full length of said front wall of said cage.

9. The device of claim **8**, wherein said upper clamping plate further comprises first and second side edges; said cut-out of said upper clamping plate being centrally disposed between said first and second side edges.

10. The device of claim **9**, wherein said cut-out of said upper clamping plate extends inwardly a distance at least one-half the length of said upper clamping plate.

11. The device of claim **10**, wherein said fastener comprises a plurality of bolts.

12. The device of claim **11**, wherein said mounting holes of said upper clamping plate are threaded holes and said mounting holes of said lower clamping plate of said ball joint assembly are clearance holes; and said plurality of bolts pass through said clearance holes of said lower clamping plate of said ball joint assembly, through said first and second slot portions of said top wall of said cage, and threaded with said threaded holes of said upper clamping plate.

13. The device of claim **12**, wherein said cut-out of said upper clamping plate is substantially the same shape as said inward portion of said ball joint housing.

14. The device of claim **13**, wherein said cut-out of said upper clamping plate is concave shaped.

15. The device of claim **14**, wherein said inward portion of said ball joint housing is convex shaped.

16. The device of claim **15**, wherein said first and second slot portions of said top wall are elongated.

17. The device of claim **16**, wherein said top wall of said cage is substantially perpendicular to said front wall of said cage.

18. The device of claim **17**, wherein said cut-out of said cage has a centerline aligned with said centerline of said ball joint housing.

19. The device of claim **11**, wherein said mounting holes of said upper clamping plate are clearance holes and said mounting holes of said lower clamping plate of said ball joint assembly are threaded holes; and said plurality of bolts pass through said clearance holes of said upper clamping plate, through said first and second slot portions of said top wall of said cage, and threaded with said threaded holes of said lower clamping plate of said ball joint assembly.

* * * * *

EXHIBIT B - U.S. PATENT NO. 7,857,332

US007857332B2

(12) **United States Patent**
Hsu

(10) **Patent No.: US 7,857,332 B2**
(45) **Date of Patent: Dec. 28, 2010**

(54) **CAMBER ARM AND BALL JOINT ASSEMBLY**

(75) Inventor: **David Hsu**, Norco, CA (US)

(73) Assignee: **Group-A Autosports, Inc.**, Norco, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 197 days.

(21) Appl. No.: **12/234,287**

(22) Filed: **Sep. 19, 2008**

(65) **Prior Publication Data**

US 2010/0072719 A1 Mar. 25, 2010

(51) **Int. Cl.**
B62D 17/00 (2006.01)

(52) **U.S. Cl.** **280/86.757**; 280/86.751

(58) **Field of Classification Search** 280/5.521, 280/86.751, 86.757

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,290,923	A *	7/1942	Wahlberg	280/86.757
2,544,331	A *	3/1951	Kogstrom	280/86.754
2,605,118	A *	7/1952	Booth et al.	280/86.756
2,664,297	A *	12/1953	Booth	280/86.757
2,684,253	A *	7/1954	Leighton	280/86.751
2,900,196	A *	8/1959	Nienke	280/86.756
2,923,555	A *	2/1960	Kost et al.	280/86.756
3,273,909	A *	9/1966	Muller et al.	280/86.756
3,999,779	A *	12/1976	Bishop	280/5.521
4,973,075	A *	11/1990	Rori et al.	280/86.757
5,292,149	A *	3/1994	Luger	280/5.521
5,361,864	A *	11/1994	Tanaka	180/219
5,538,273	A *	7/1996	Osenbaugh et al.	280/86.756
5,697,632	A *	12/1997	Burman et al.	280/86.756
5,951,030	A *	9/1999	Butler	280/86.751
6,224,075	B1 *	5/2001	McIntyre	280/86.751
6,293,724	B1 *	9/2001	Spears et al.	403/122
6,478,318	B1 *	11/2002	Allman et al.	280/86.751
6,485,038	B1 *	11/2002	Garrard	280/86.75
6,557,872	B1 *	5/2003	Garrard	280/86.751
6,932,366	B2 *	8/2005	Jones et al.	280/86.751
7,278,648	B2 *	10/2007	Bobbitt et al.	280/86.751
7,467,800	B2 *	12/2008	Houser et al.	280/5.521
7,513,514	B1 *	4/2009	Schlosser et al.	280/93.511
7,568,711	B2 *	8/2009	Houser et al.	280/86.756
D602,408	S *	10/2009	Hsu	D12/159

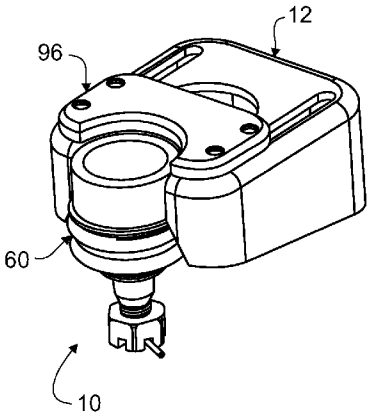
* cited by examiner

Primary Examiner—Paul N Dickson
Assistant Examiner—Laura Freedman
(74) *Attorney, Agent, or Firm*—Steven N. Fox, Esq.

(57) **ABSTRACT**

A device for adjusting camber angle of a vehicle tire/wheel assembly, comprising a camber arm having first and second arms and a cage. The cage comprises a cavity, top and front walls, sidewalls, and a cut-out, the first and second arms connected to the sidewalls. The device further comprises a ball joint assembly adjustably engaged with the cage, and comprising a housing and a lower clamping plate. The device further comprises an upper clamping plate, the upper and lower clamping plates bolted to the cage top wall. The ball joint assembly moveable from a first position where an outward portion of the ball joint housing is disposed outside of the cage cavity, and a second position where the outward portion of the ball joint housing is disposed within the cage cavity.

16 Claims, 15 Drawing Sheets



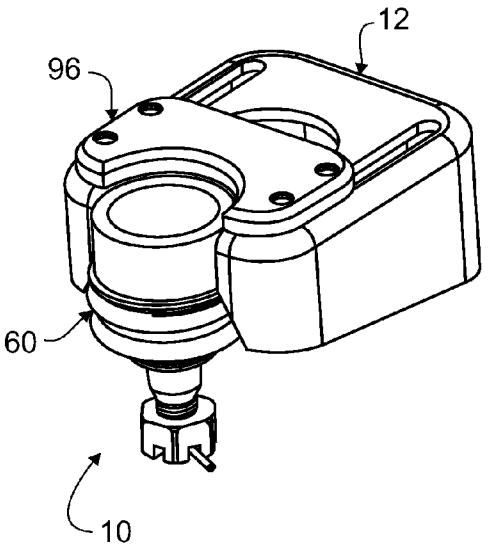


FIG. 1

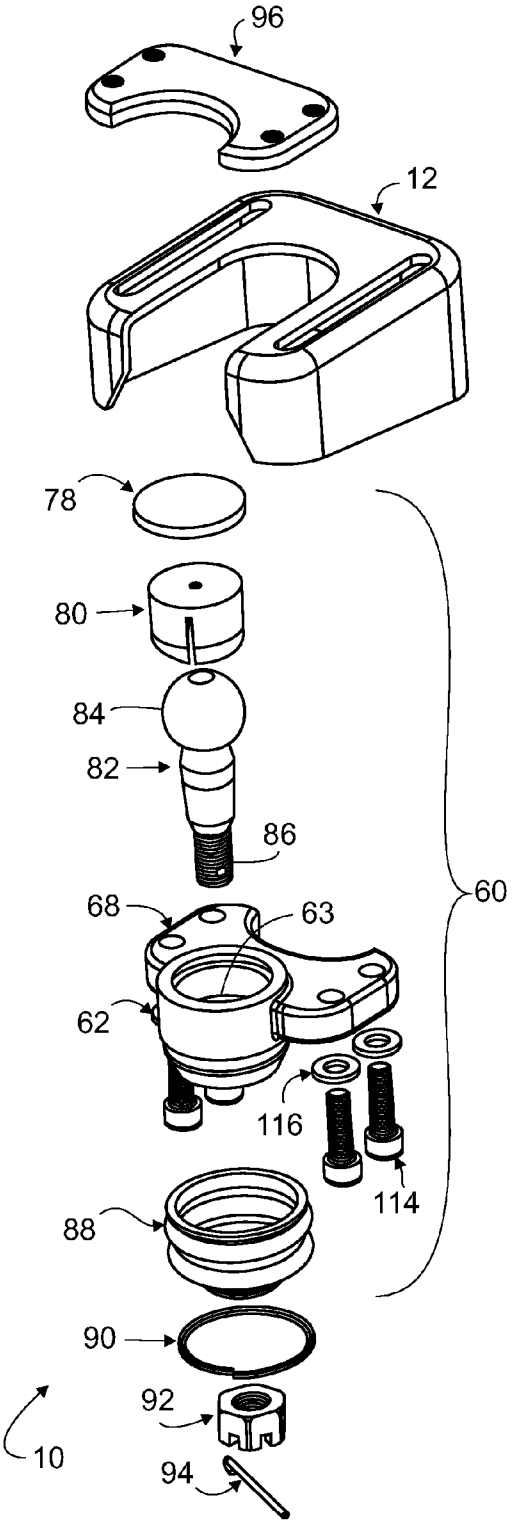


FIG. 2

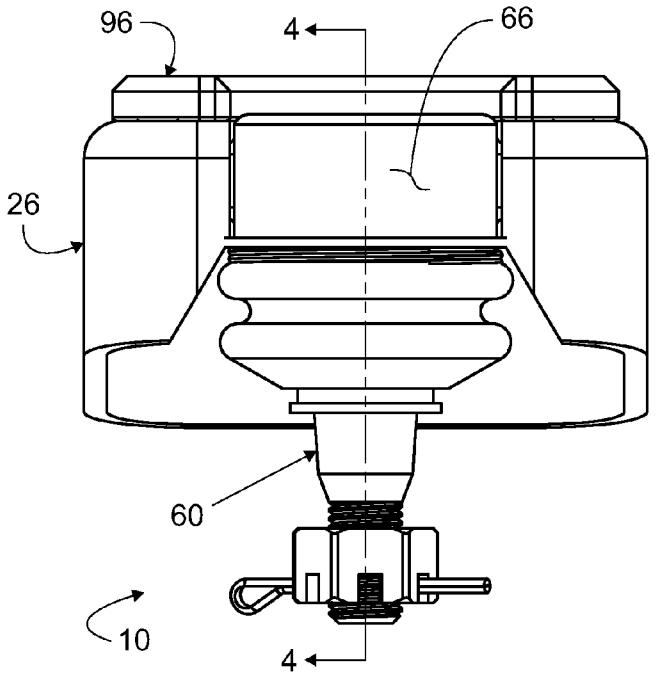


FIG. 3

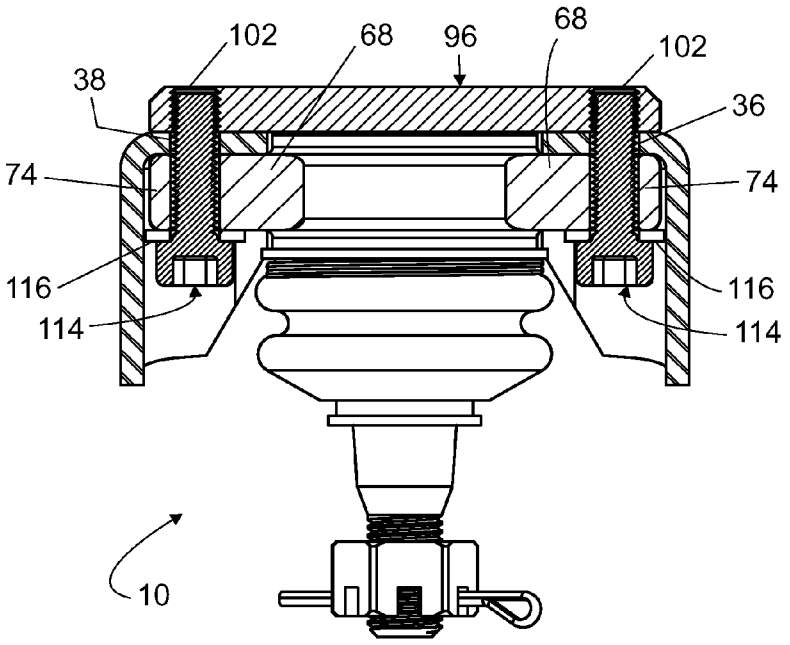


FIG. 5

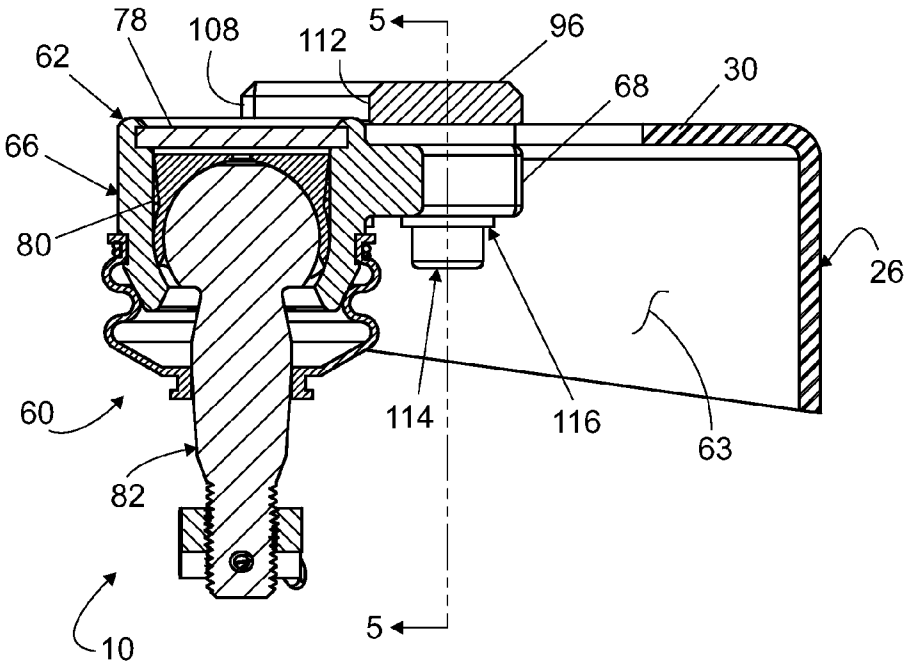


FIG. 4A

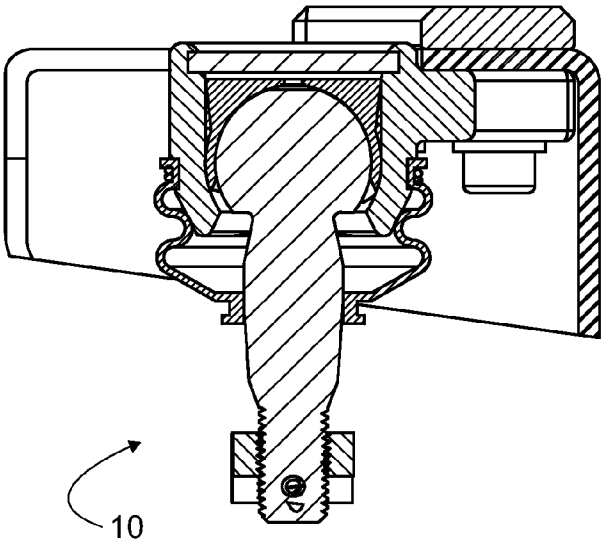


FIG. 4B

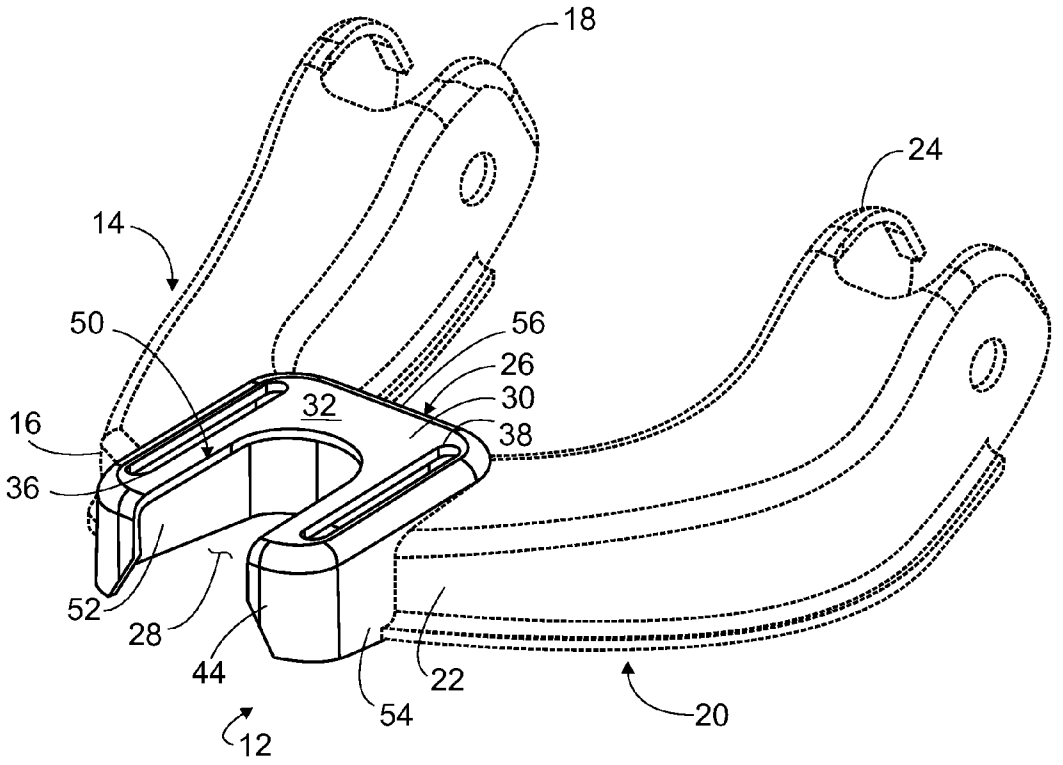


FIG. 6

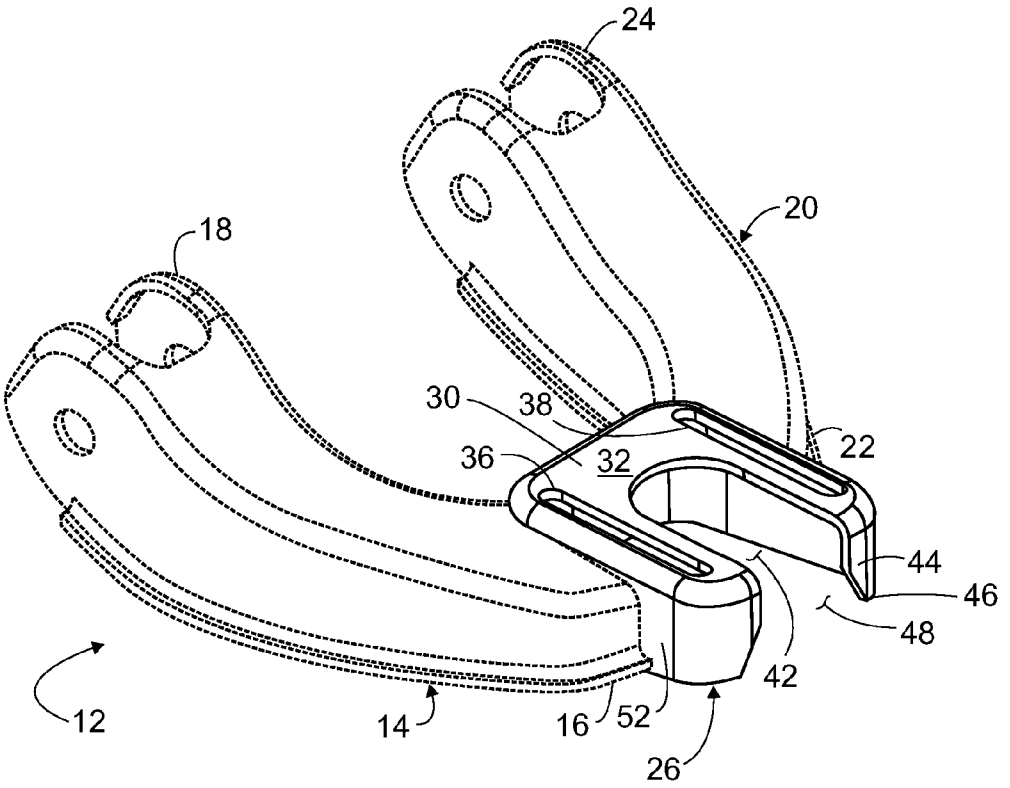


FIG. 7

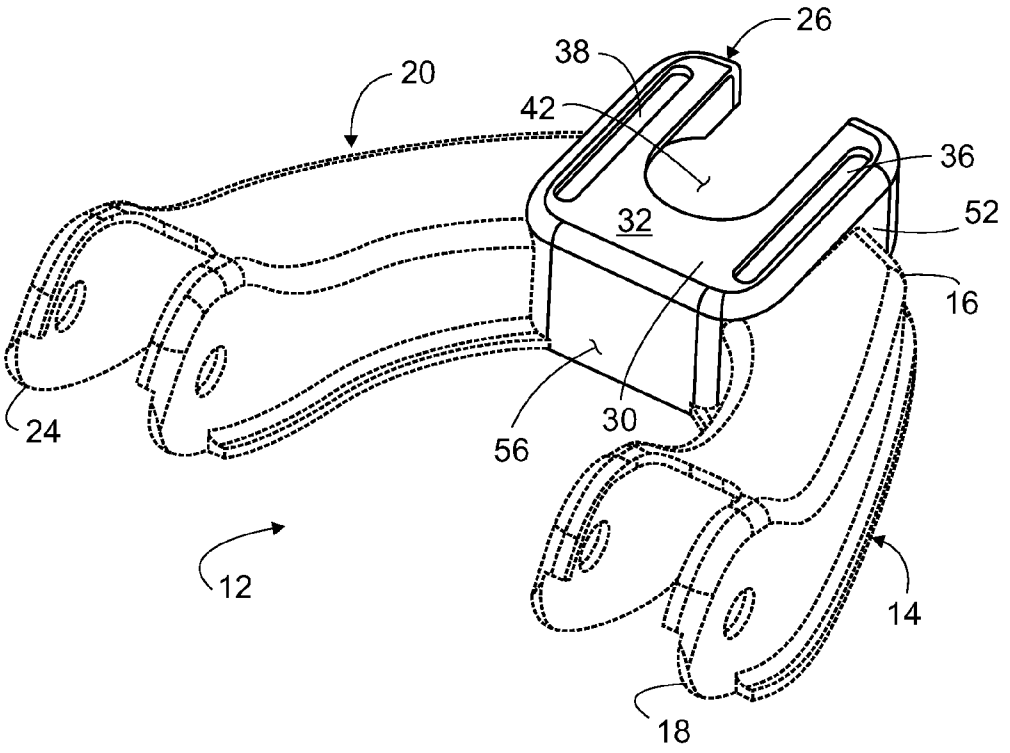


FIG. 8

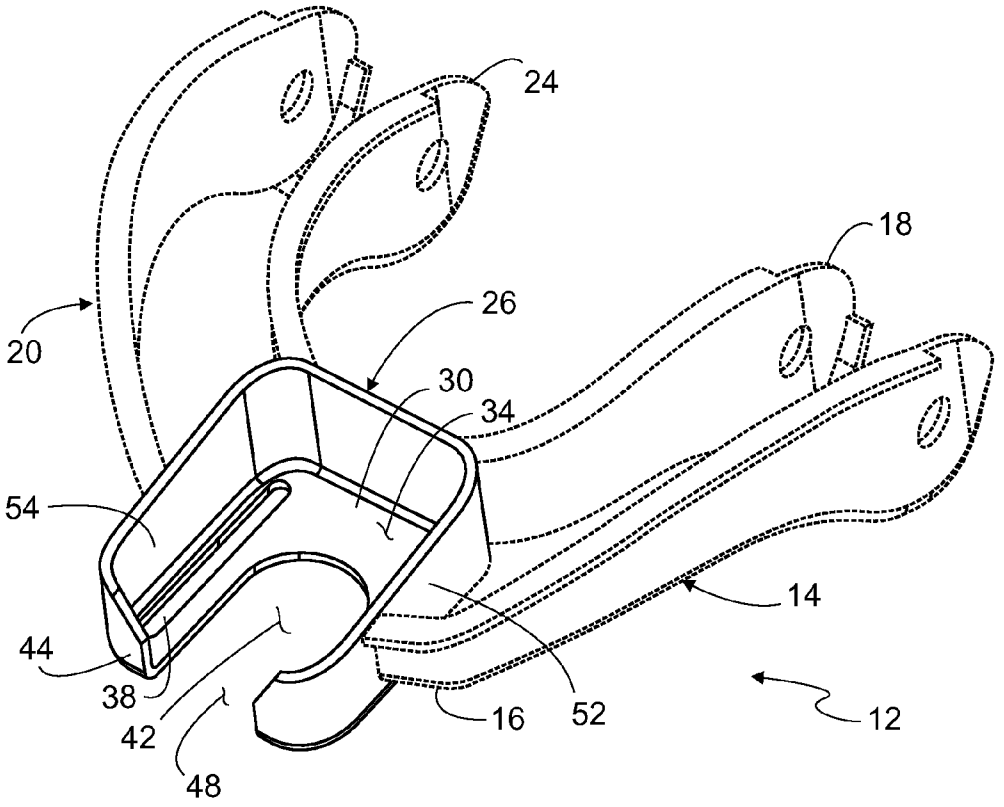


FIG. 9

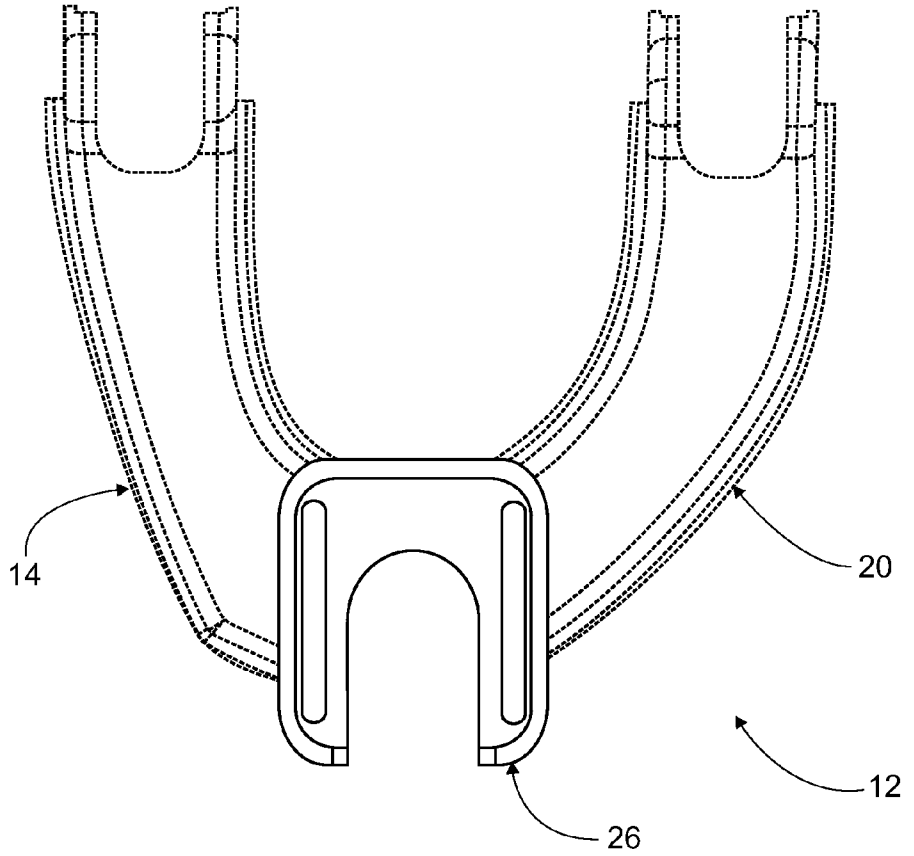


FIG. 10

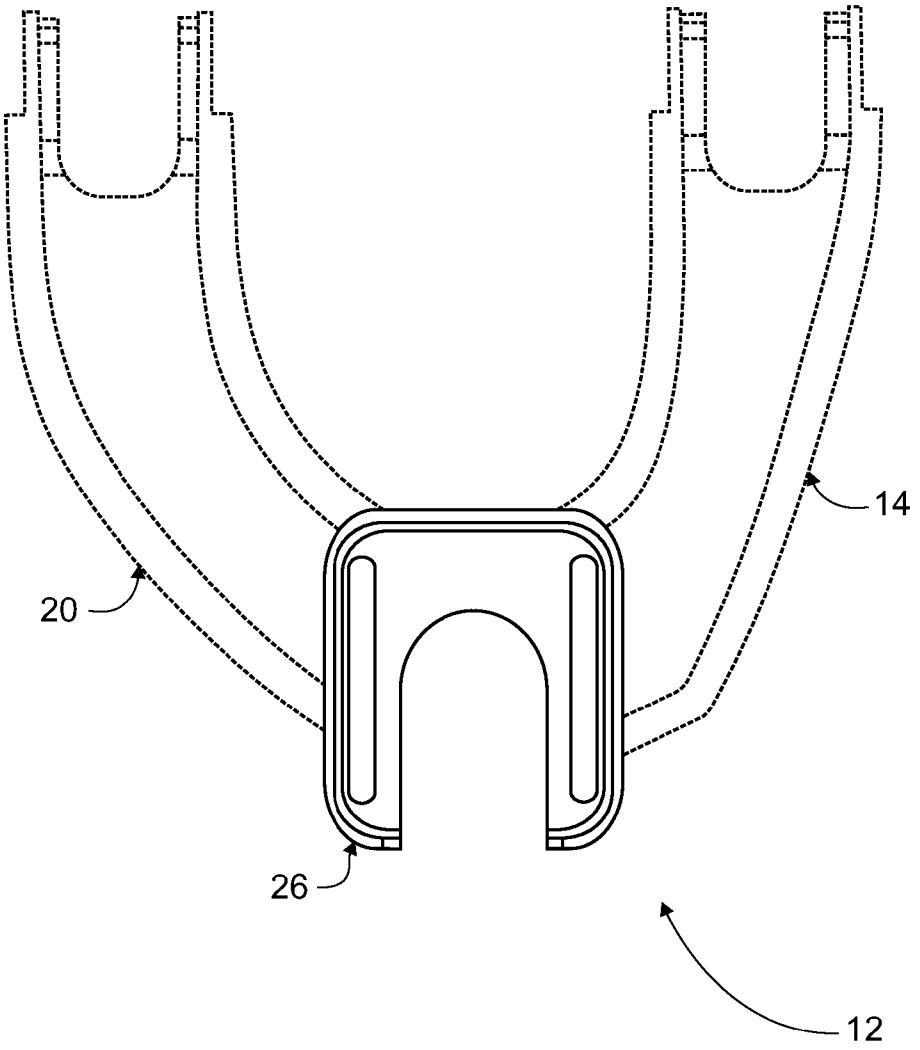


FIG. 11

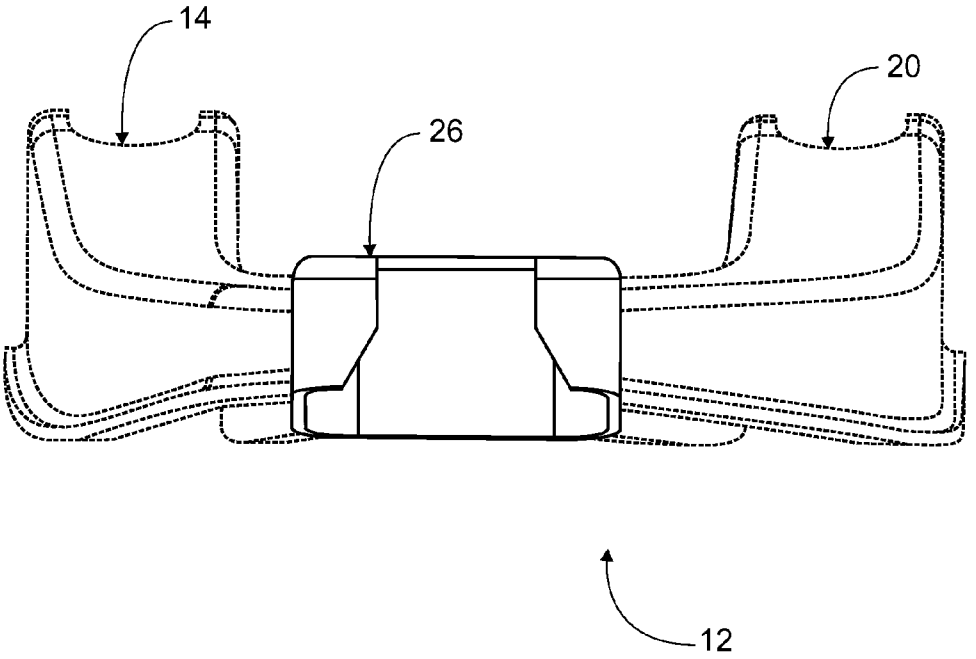


FIG. 12

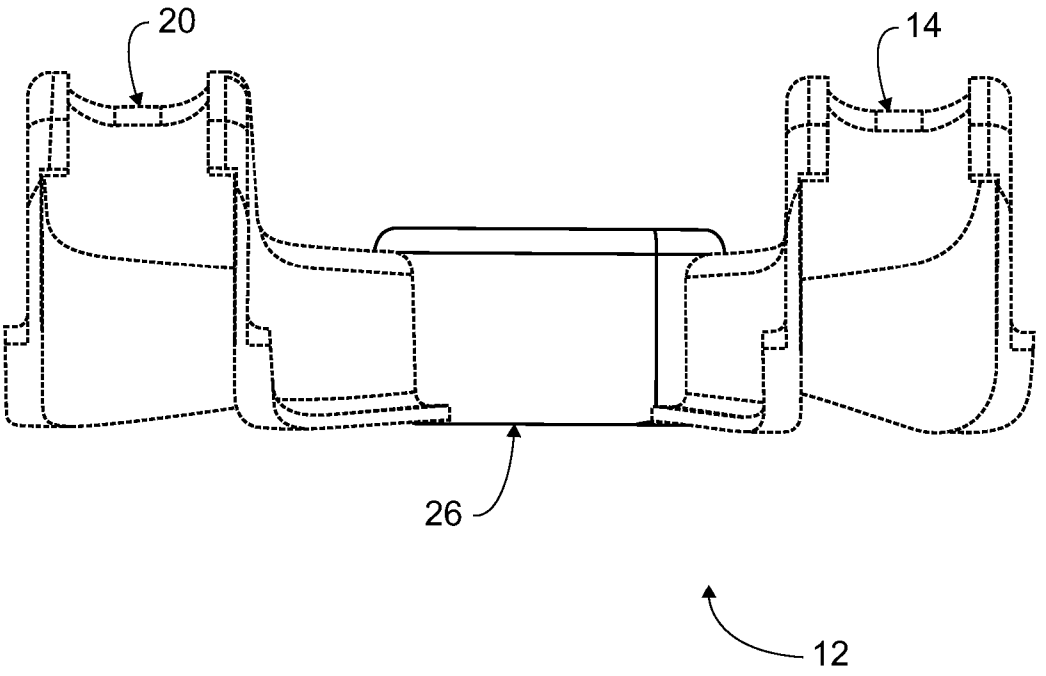


FIG. 13

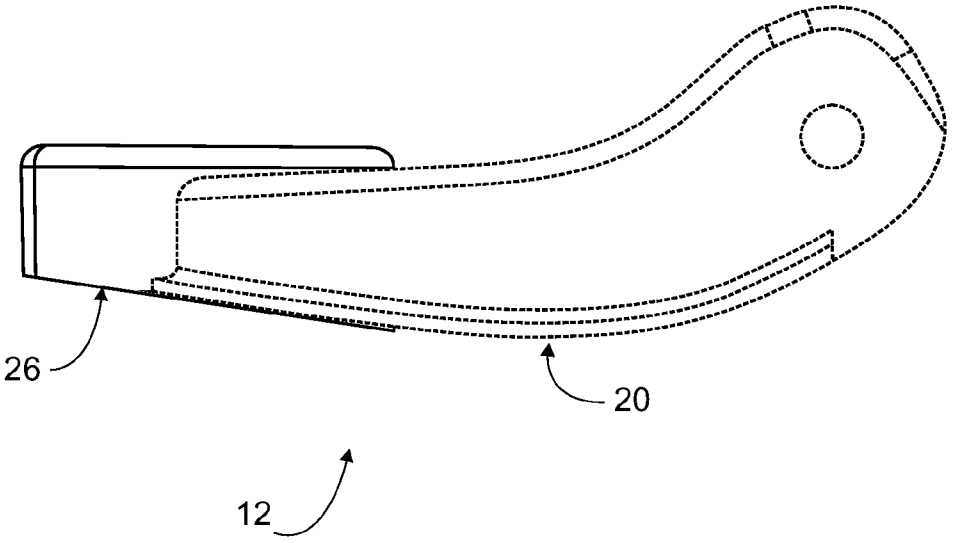


FIG. 14

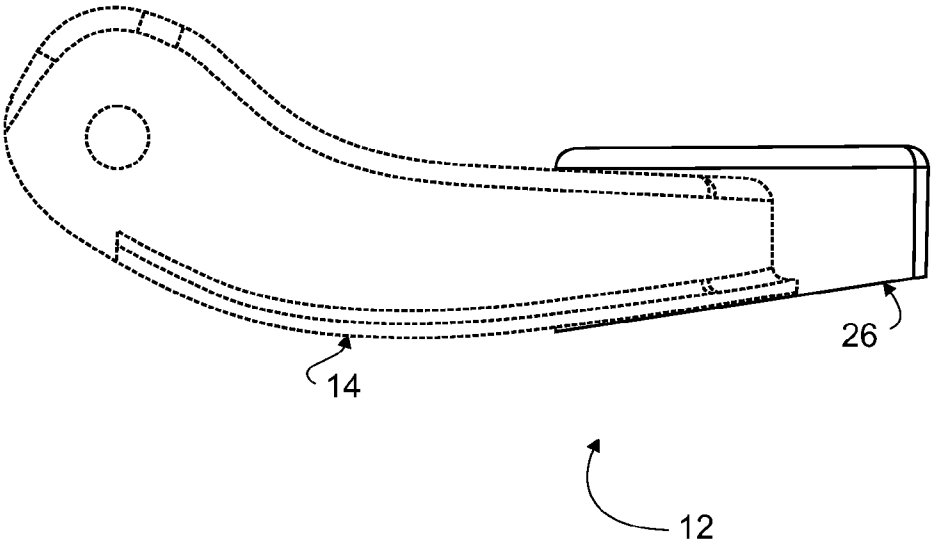
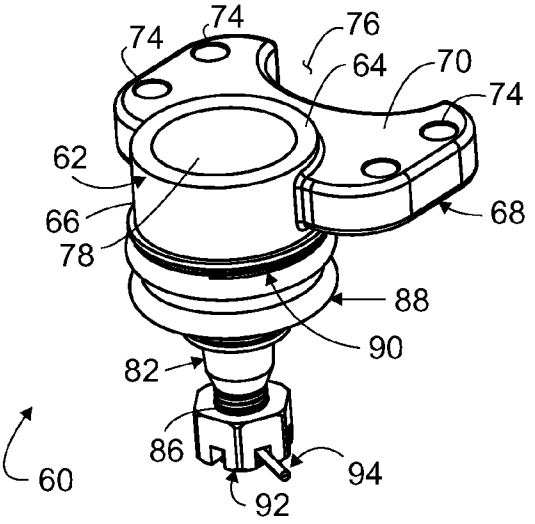


FIG. 15


74
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76
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66
78
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82
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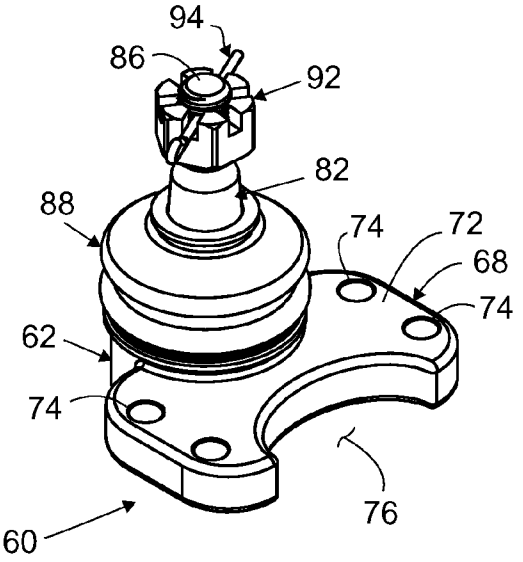
94
92
60

FIG. 16


94
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92
82
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72
68
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76
60

FIG. 17

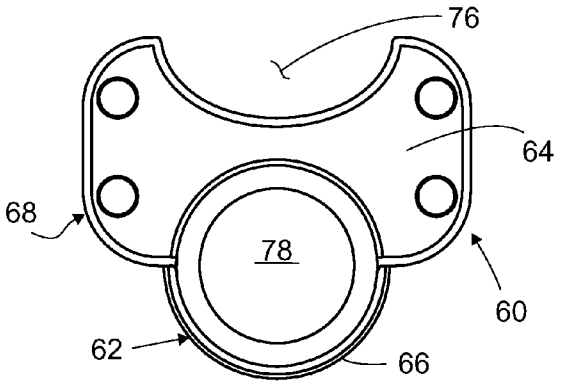


FIG. 18

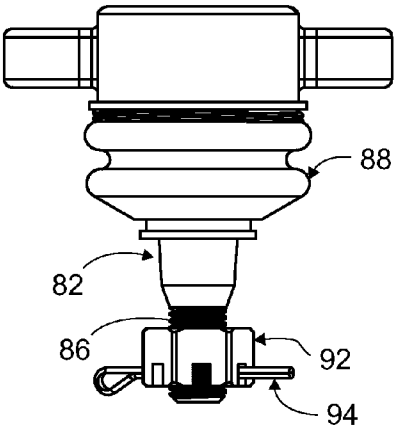


FIG. 19

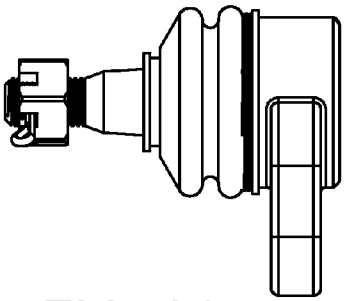


FIG. 21

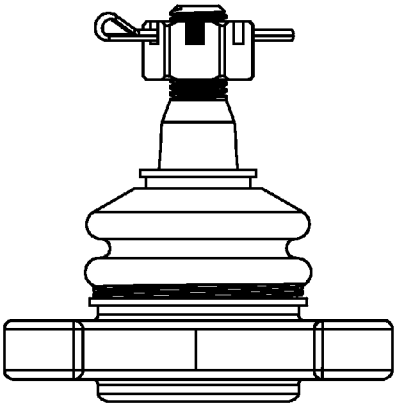


FIG. 20

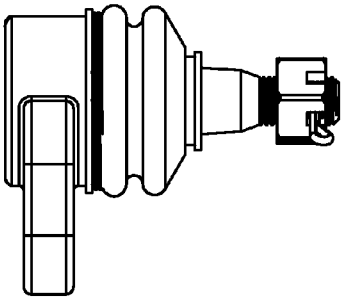


FIG. 22

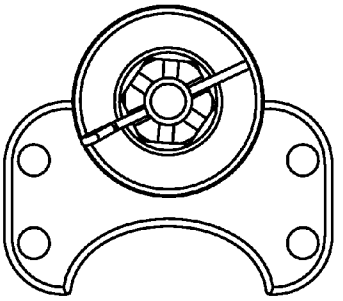


FIG. 23

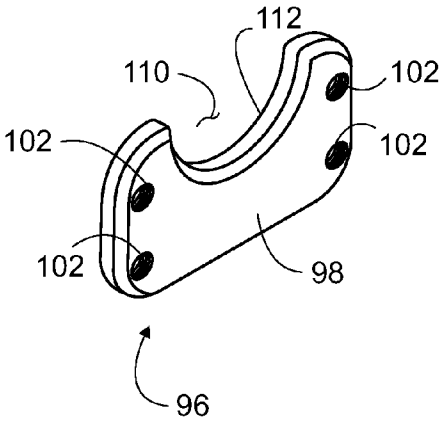


FIG. 24

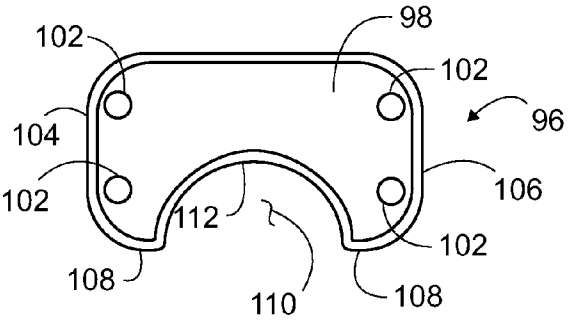


FIG. 25

FIG. 26

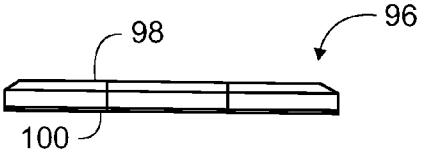


FIG. 27

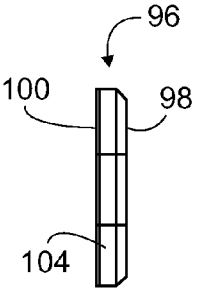


FIG. 28

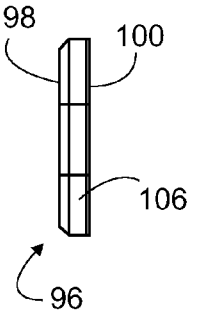


FIG. 29

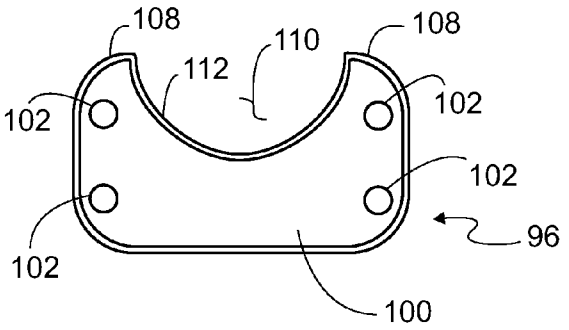


FIG. 30

CAMBER ARM AND BALL JOINT ASSEMBLY

BACKGROUND OF THE INVENTION

A camber arm is used to adjust the camber angle of a tire/wheel assembly of a vehicle. The camber angle is the inward or outward tilt of the tire/wheel assembly and is measured from a true vertical line perpendicular to the ground. A tire/wheel assembly that is tilted outward at the top is considered to have positive camber. In contrast, a tire/wheel assembly tilted inward at the top is considered to have negative camber. For a zero setting, the tire/wheel assembly is in an exact vertical position or perpendicular to the ground. Positive camber results in a dynamic loading that allows the tire to run relatively flat against the road surface. Positive camber directs the weight and shock load of the vehicle on the larger inner wheel bearing and inboard portion of the spindle rather than the outboard bearing. A moderate positive camber results in longer bearing life, less likely sudden load failure, and easier steering. Excessive positive camber wears the outside of the tire and may cause wear to suspension parts such as wheel bearings and spindles. Negative camber can be used to improve the handling of a vehicle. A setting of ½° negative on both sides of a street car will improve cornering without affecting tire life greatly. This negative setting compensates for the slight positive camber change of the outside tire due to vehicle roll, thereby allowing a flatter tire contact patch during cornering. Excessive negative camber wears the inside of the tire and can cause wear and stress on suspension parts. Conventional devices do not allow the camber angle to be adjusted between a satisfactory range of positive and negative camber angles without failure under severe dynamic loads.

SUMMARY OF THE INVENTION

One object of the present invention is to provide a camber arm that allows the camber angle to be adjusted between a wider range of positive and negative camber angles without failure under severe dynamic loads.

The present invention is a device for adjusting the camber angle of a tire/wheel assembly of a vehicle. In one embodiment, the device comprises a camber arm having first and second arms and a cage. The cage comprises a cavity, a top wall, a front wall, and first and second sidewalls. The first and second arms are connected to the first and second sidewalls of the cage. The top wall comprises an outside surface, an inside surface, and first and second slot portions. The cage further comprising a cut-out extending along the front and top walls. The device further comprises a ball joint assembly adjustably engaged with the cage. The ball joint assembly comprises a ball joint housing and a lower clamping plate that is adjustably fastened to the inside surface of the top wall. The ball joint housing has an outward portion and an inward portion. The device further comprises an upper clamping plate having an outside surface, an inside surface, a plurality of mounting holes, a front edge portion, first and second side edge portions, and a cut-out having an inner edge portion. The cut-out extends inward from the front edge portion to the inner edge portion to allow access to the ball joint housing when assembled. The device further comprises a plurality of bolts for fastening the upper clamping plate and the lower clamping plate of the ball joint assembly to the top wall of the cage. The ball joint assembly may be adjustably moved from a first position where the outward portion of the ball joint housing is disposed outside of the cavity of the cage and a second position where the outward portion of the ball joint housing is disposed within the cavity of the cage.

BRIEF DESCRIPTION OF THE DRAWINGS

The following detailed description of the invention will more fully understood with reference to the accompanying drawings wherein:

FIG. **1** is a perspective view of the camber arm assembly according to the present invention shown without left and right camber arms;

FIG. **2** is an exploded view of the camber arm assembly without left and right camber arms;

FIG. **3** is a front elevation view of the camber arm assembly without left and right camber arms;

FIG. **4**A is a cross-section view taken along line **4**-**4** of FIG. **3** without left and right camber arms and showing the outward portion of the ball joint housing disposed outward of the cavity of the cage;

FIG. **4**B is a cross-section view taken along line **4**-**4** of FIG. **3** without left and right camber arms and showing the outward portion of the ball joint housing disposed within the cavity of the cage;

FIG. **5** is a cross-section view taken along line **5**-**5** of FIG. **5** without left and right camber arms;

FIGS. **6** and **7** are top front perspective views of the camber arm according to the present invention;

FIG. **8** is a top rear perspective view of the camber arm;

FIG. **9** is a bottom front perspective view of the camber arm;

FIG. **10** is a top plan view of the camber arm;

FIG. **11** is a bottom plan view of the camber arm;

FIG. **12** is a front elevation view of the camber arm;

FIG. **13** is a rear elevation view of the camber arm;

FIG. **14** is a left side elevation view of the camber arm;

FIG. **15** is a right side elevation view of the camber arm;

FIG. **16** is a top perspective view of the ball joint assembly according to the present invention;

FIG. **17** is a bottom perspective view of the ball joint assembly;

FIG. **18** is a top plan view of the ball joint assembly;

FIG. **19** is a front elevation view of the ball joint assembly;

FIG. **20** is a rear elevation view of the ball joint assembly;

FIG. **21** is a left side elevation view of the ball joint assembly;

FIG. **22** is a right side elevation view of the ball joint assembly;

FIG. **23** is a bottom plan view of the ball joint assembly;

FIG. **24** is a top perspective view of the upper clamping plate according to the present invention;

FIG. **25** is a top plan view of the upper clamping plate;

FIG. **26** is a front elevation view of the upper clamping plate;

FIG. **27** is a rear elevation view of the upper clamping plate;

FIG. **28** is a left side elevation view of the upper clamping plate;

FIG. **29** is a right side elevation view of the upper clamping plate; and

FIG. **30** is a bottom plan view of the upper clamping plate.

DESCRIPTION OF THE INVENTION

Referring to FIGS. **1**-**2**, the present invention is a device **10** for adjusting the camber angle of a tire/wheel assembly (not shown) of a vehicle. In one embodiment, device **10** generally comprises a camber arm assembly **12**, a ball joint assembly **60**, and an upper clamping plate **96**. For ease of illustration, left and right arms **14** and **20** (to be described) are not shown. Ball joint assembly **60** may be adjustably positioned on cam-

ber arm assembly **12** and secured thereto by upper clamping plate **96** and bolts **114** and washers **116**.

Referring to FIGS. **6-15**, camber arm assembly **12** generally comprises left and right arms **14** and **20**, and a central cage **26**. Left arm **14** generally comprises a first end portion **16** and a second end portion **18**. Right arm **20** generally comprises a first end portion **22** and a second end portion **24**. Cage **26** generally comprises a cavity **28**, a top wall **30**, a front wall **44**, first and second sidewalls **52** and **54**, and a rear wall **56**. Cage **26** further comprises a large cut-out **50** formed by a cut-out **42** (to be described) along top wall **30** and a cut-out **48** (to be described) along front wall **44**. Second end portions **18** and **24** of first and second arms **14** and **20** are adapted for connection to the chassis frame (not shown) of the vehicle. In the embodiment shown, first end portions **16** and **22** of first and second arms **14** and **20** are secured to left and right sidewalls **52** and **54** (to be described) of cage **26**, respectively, by conventional means such as welding. Arms **14** and **20** may be of any desired shape and configuration based upon the chassis frame or other vehicle specifications. Top wall **30** of cage **26** comprises an outside surface **32**, an inside surface **34**, and first and second slots **36** and **38**; and a cut-out **42**. First and second slots **36** and **38** receive bolts **114** so that upper clamping plate **96** and lower clamping plate **68** of ball joint assembly **60** may be adjustably secured to and along top wall **30** of cage **26** by sliding the assembly within slots **36** and **38**. Front wall **44** comprises a bottom edge **46** and a cut-out **48**. Arms **14** and **20**, and cage **26** are made from steel and fabricated by conventional stamping and machining operations.

Referring to FIGS. **2** and **16-23**, ball joint assembly **60** comprises a ball joint housing **62** having a cavity **63**, an inward portion **64**, and an outward portion **66**. Ball joint assembly **60** further comprises a lower clamping plate **68** extending outward from inward portion **64**. Lower clamping plate **68** comprises an upper surface **70**, a lower surface **72**, mounting holes **74**, and a cut-out **76**. In the embodiment shown, mounting holes **74** are clearance holes to receive bolts **114** which are then threaded into mounting holes **102** (to be described) of upper clamping plate **96**. In other embodiments, mounting holes **74** may be threaded holes and mounting holes **102** (to be described) of upper clamping plate **96** may be clearance holes wherein bolts **114** would be inserted into clearance holes **102** (to be described) and then threaded into mounting holes **74**. Housing **62** and lower clamping plate **68** are made from steel and fabricated as a single cast piece by conventional casting and machining operations. Ball joint assembly **60** further comprises a ball joint **82** having a ball portion **84** and a threaded end portion **84**. Ball joint assembly **60** further comprises a plastic sleeve **80** and a housing cover **78**. Sleeve **80** is disposed about ball portion **84** of ball joint **82** and inserted within cavity **63** of ball joint housing **62** such that threaded end portion **84** extends downward out of cavity **63**. Cover **78** is removably engaged with ball joint housing **62** by a force-fit to enclose cavity **63**. Ball joint **82**, sleeve **80**, and housing cover **78** are well known in the industry and widely available. Ball joint assembly **60** further comprises a rubber dust boot **88** to prevent dust or other contamination from entering cavity **63** of ball joint housing **62**. Dust boot **88** is well known in the industry and widely available. Ball joint assembly **60** further comprises a locking ring **90** to retain dust boot **88** about ball joint housing **62**. Locking ring **90** is well known in the industry and widely available. Ball joint assembly **60** further comprises a castle nut **92** and a locking pin **94** to prevent the spindle or steering knuckle (not shown) from being disengaged from ball joint **82**. Nut **92** and locking pin **94** are well known in the industry and widely available.

Referring to FIGS. **24-30**, upper clamping plate **96** comprises an upper surface **98**, a lower surface **100**, and a plurality of threaded mounting holes **102** extending from upper surface **98** to lower surface **100**. Upper clamping plate **96** further comprises side edges portions **104** and **106**, a front edge portion **108**, and a cut-out **110** having an inner edge portion **112**. Cut-out **110** extends inward from front edge portion **108** to inner edge portion **112** to allow access to cover **78** of ball joint housing **62** when assembled. Upon assembly of upper clamping plate **96** to lower clamping plate **68** of ball joint assembly **60**, inner edge portion **112** is substantially aligned and/or immediately adjacent or juxtaposed to inward portion of **64** of ball joint housing **62** thereby allowing a person access to cover **78** and cavity **63** to repair or replace ball joint **82** and/or sleeve **80**. Upper clamping plate **96** is made from steel and fabricated by conventional machining operations.

Referring to FIGS. **3-5**, bolts **114** and washers **116** securely fasten upper clamping plate **96** and lower clamping plate **68** of ball joint assembly **60** to top wall **30** of cage **26**. In the embodiment shown, lower surface **100** of upper clamping plate **96** is engaged with outside surface **32** of top wall **30** of cage **26**, and upper surface **70** of lowering clamping plate **68** of ball joint assembly **60** is engaged with inside surface **34** of top wall **30** of cage **26**. Alternatively, lower surface **72** of lowering clamping plate **68** of ball joint assembly **60** may be engaged with outside surface **32** of top wall **30** of cage **26**, and upper surface **98** of upper clamping plate **96** may be engaged with inside surface **34** of top wall **30** of cage **26**. In either fastening configuration, ball joint assembly **60** may be adjustably moved anywhere between a first position where outward portion **66** of ball joint housing **62** is disposed outside of cavity **63** (FIG. **4**A) and a second position where outward portion **66** of ball joint housing **62** is disposed within cavity **63** (FIG. **4**B). As described heretofore, mounting holes **74** of lower clamping plate **68** are clearance holes to receive or allow passage of bolts **114** which are then inserted thru slots **36** and **38** of cage **26**, and then threaded into threaded mounting holes **102** of upper clamping plate **96**. In other embodiments, mounting holes **74** may be threaded holes and mounting holes **102** of upper clamping plate **96** may be clearance holes wherein bolts **114** would be inserted into clearance holes **102** and then threaded into mounting holes **74**.

The foregoing description is intended for purposes of illustration. The invention may be embodied in other forms or carried out in other ways without departing from the spirit or scope of the invention.

What is claimed:

1. A device for adjusting the camber angle of a tire/wheel assembly of a vehicle comprising:

a camber arm comprising first and second arms and a cage; said cage comprising a cavity, a top wall, a front wall, and first and second sidewalls; said first and second arms being connected to said first and second sidewalls of said cage, respectively; said top wall comprising an outside surface, an inside surface, and first and second slot portions; said cage further comprising a cut-out extending along said front and top walls;

a ball joint assembly adjustably engaged with said cage; said ball joint assembly comprising a ball joint housing and a lower clamping plate; said ball joint housing having an outward portion and an inward portion; said lower clamping plate comprising an upper surface, a lower surface, and a plurality of mounting holes;

an upper clamping plate;

a plurality of bolts for fastening said upper clamping plate and said lower clamping plate of said ball joint assembly to said top wall of said cage; and

whereby said ball joint assembly may be adjustably moved from a first position where said outward portion of said ball joint housing is disposed outside of said cavity to a second position where said outward portion of said ball joint housing is disposed within said cavity.

2. The device of claim **1**, wherein said upper clamping plate comprises an upper surface, a lower surface, a plurality of mounting holes, a front edge portion, and a cut-out having an inner edge portion; said cut-out extending inward from said front edge portion to said inner edge portion to allow access to said ball joint housing when assembled.

3. The device of claim **2**, wherein said lower surface of said upper clamping plate is engaged with said outside surface of said upper wall of said cage; and said upper surface of said lowering clamping plate of said ball joint assembly is engaged with said inside surface of said top wall of said cage.

4. The device of claim **2**, wherein said lower surface of said lowering clamping plate of said ball joint assembly is engaged with said outside surface of said top wall of said cage; and said upper surface of said upper clamping plate of said ball joint assembly is engaged with said inside surface of said upper wall of said cage.

5. The device of claim **3**, wherein said cut-out of said cage is centrally disposed along said front and top walls of said cage.

6. The device of claim **5**, wherein said cut-out of said cage extends the full length of said front wall of said cage.

7. The device of claim **6**, wherein said upper clamping plate further comprises first and second side edges; and said cut-out of said upper clamping plate being centrally disposed between said first and second side edges.

8. The device of claim **7**, wherein said cut-out of said upper clamping plate extends inwardly a distance at least one-half the length of said upper clamping plate.

9. The device of claim **8**, wherein said mounting holes of said upper clamping plate are threaded holes and said mounting holes of said lower clamping plate of said ball joint assembly are clearance holes; and said plurality of bolts pass through said clearance holes of said lower clamping plate of said ball joint assembly, through said first and second slot portions of said top wall of said cage, and threaded with said threaded holes of said upper clamping plate.

10. The device of claim **8**, wherein said mounting holes of said upper clamping plate are clearance holes and said mounting holes of said lower clamping plate of said ball joint assembly are threaded holes; and said plurality of bolts pass through said clearance holes of said upper clamping plate, through said first and second slot portions of said top wall of said cage, and threaded with said threaded holes of said lower clamping plate of said ball joint assembly.

11. The device of claim **10**, wherein said cut-out of said upper clamping plate is substantially the same shape as said inward portion of said ball joint housing.

12. The device of claim **11**, wherein said cut-out of said upper clamping plate is concave shaped.

13. The device of claim **12**, wherein said inward portion of said ball joint housing is convex shaped.

14. The device of claim **13**, wherein said first and second slots are elongated.

15. The device of claim **14**, wherein said top wall of said cage is substantially perpendicular to said front wall of said cage.

16. The device of claim **15**, wherein said cut-out of said cage has a centerline aligned with said centerline of said ball joint housing.

* * * * *

EXHIBIT C - U.S. PATENT NO. D602408

US00D602408S

(12) United States Design Patent

Hsu

(10) Patent No.: US D602,408 S
(45) Date of Patent: ** Oct. 20, 2009

(54) **PORTION OF A CAMBER ARM**

(76) Inventor: **David Hsu**, 2050 5th St., Norco, CA (US) 92860

(**) Term: **14 Years**

(21) Appl. No.: **29/323,436**

(22) Filed: **Aug. 26, 2008**

(51) **LOC (9) Cl.** **12-16**
(52) **U.S. Cl.** **D12/159**
(58) **Field of Classification Search** D12/400, D12/340, 161, 159, 120, 118, 114; 280/11.225, 280/86.752; 188/315, 316, 298, 274, 281, 188/286, 297; 293/134; 267/195; 279/2.01, 279/2.17
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,530,514	A *	7/1985	Ito	280/124.13
2004/0021286	A1 *	2/2004	Bombardier et al.	280/124.134
2004/0094927	A1 *	5/2004	Nagreski et al.	280/93.512
2005/0127634	A1 *	6/2005	Gerrard	280/124.143
2005/0212244	A1 *	9/2005	Bobbitt et al.	280/86.751
2009/0066051	A1 *	3/2009	Gerrard	280/124.134

* cited by examiner

Primary Examiner—T. Chase Nelson
Assistant Examiner—Michael A Pratt

(57) **CLAIM**

The ornamental design for a portion of a camber arm, as shown and described.

DESCRIPTION

FIG. **1** is a top front perspective view of the design according to the present invention;

FIG. **2** is another top front perspective view of the design according to the present invention;

FIG. **3** is a top rear perspective view of the design according to the present invention;

FIG. **4** is a bottom front perspective view of the design according to the present invention;

FIG. **5** is a top plan view of the design according to the present invention;

FIG. **6** is a bottom plan view of the design according to the present invention;

FIG. **7** is a front elevation view of the design according to the present invention;

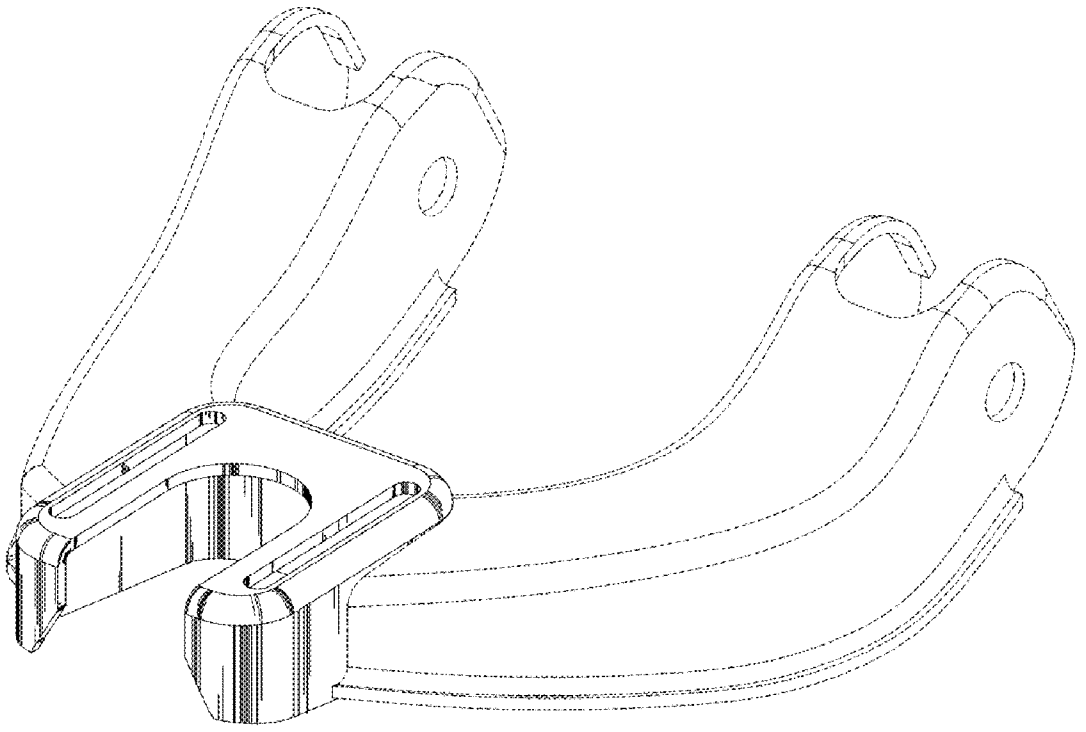
FIG. **8** is a rear elevation view of the design according to the present invention;

FIG. **9** is a left side elevation view of the design according to the present invention; and,

FIG. **10** is a right side elevation view of the design according to the present invention.

The broken lines in the drawings are environmental and form no part of the claimed design.

1 Claim, 10 Drawing Sheets



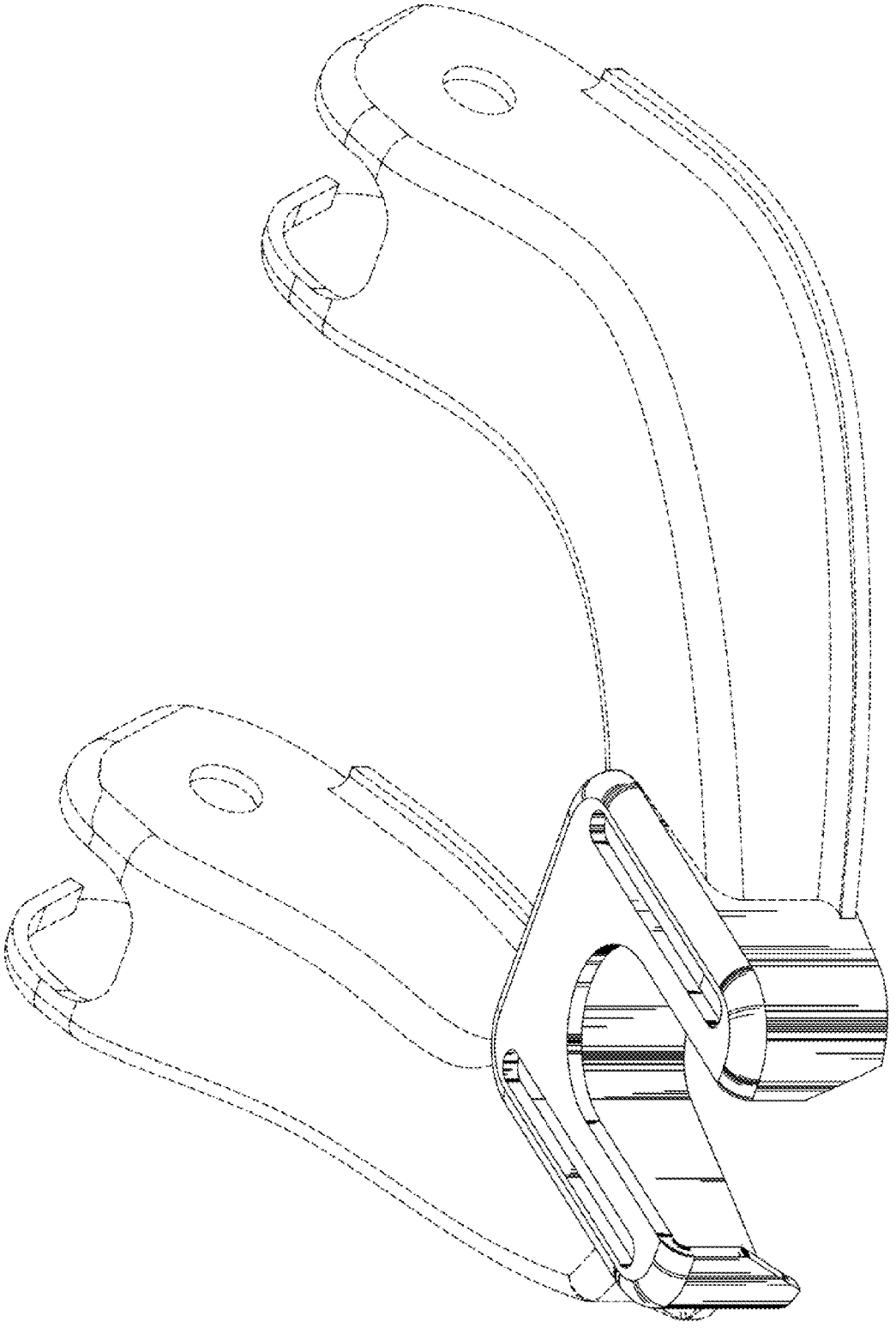


FIG. 1

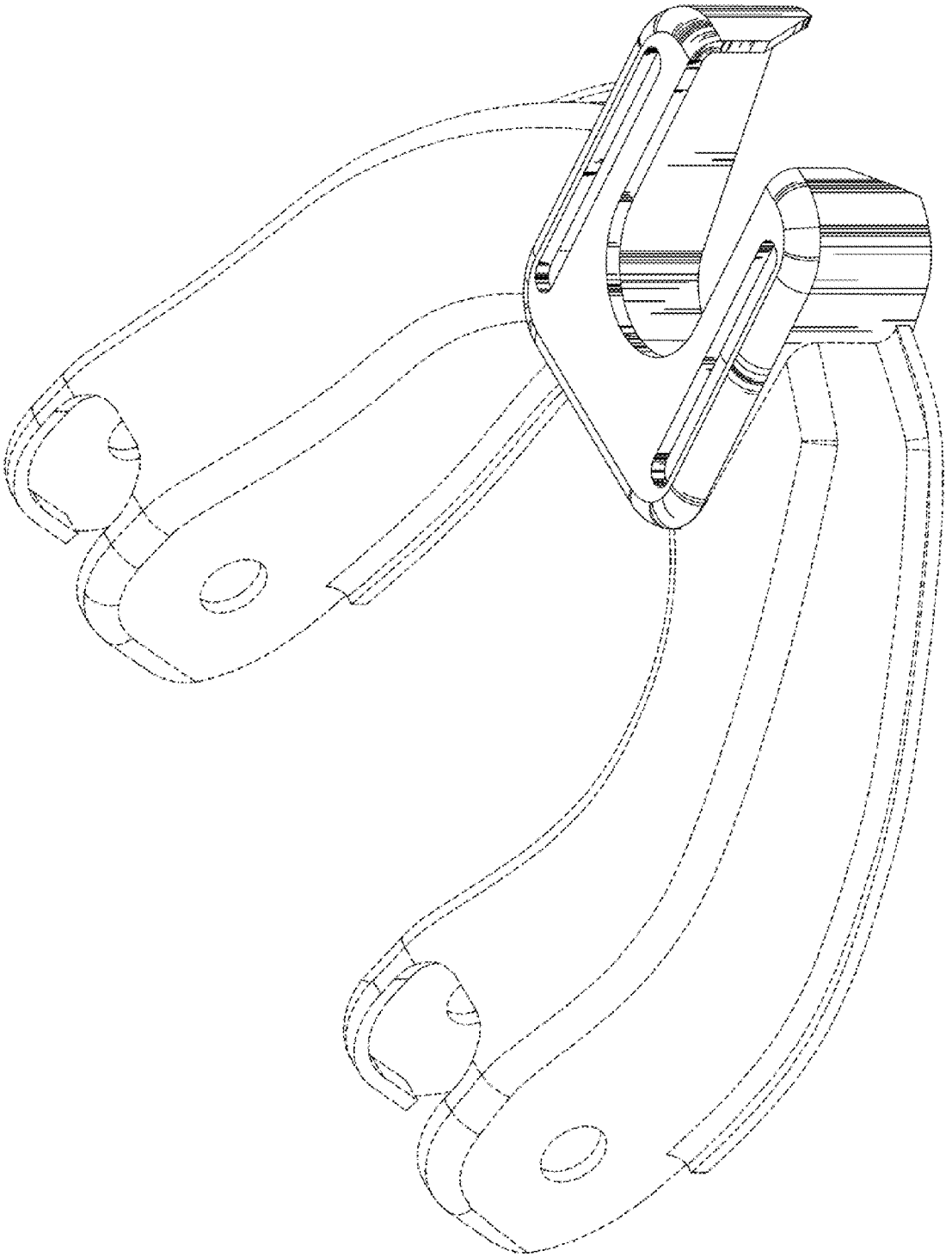


FIG. 2

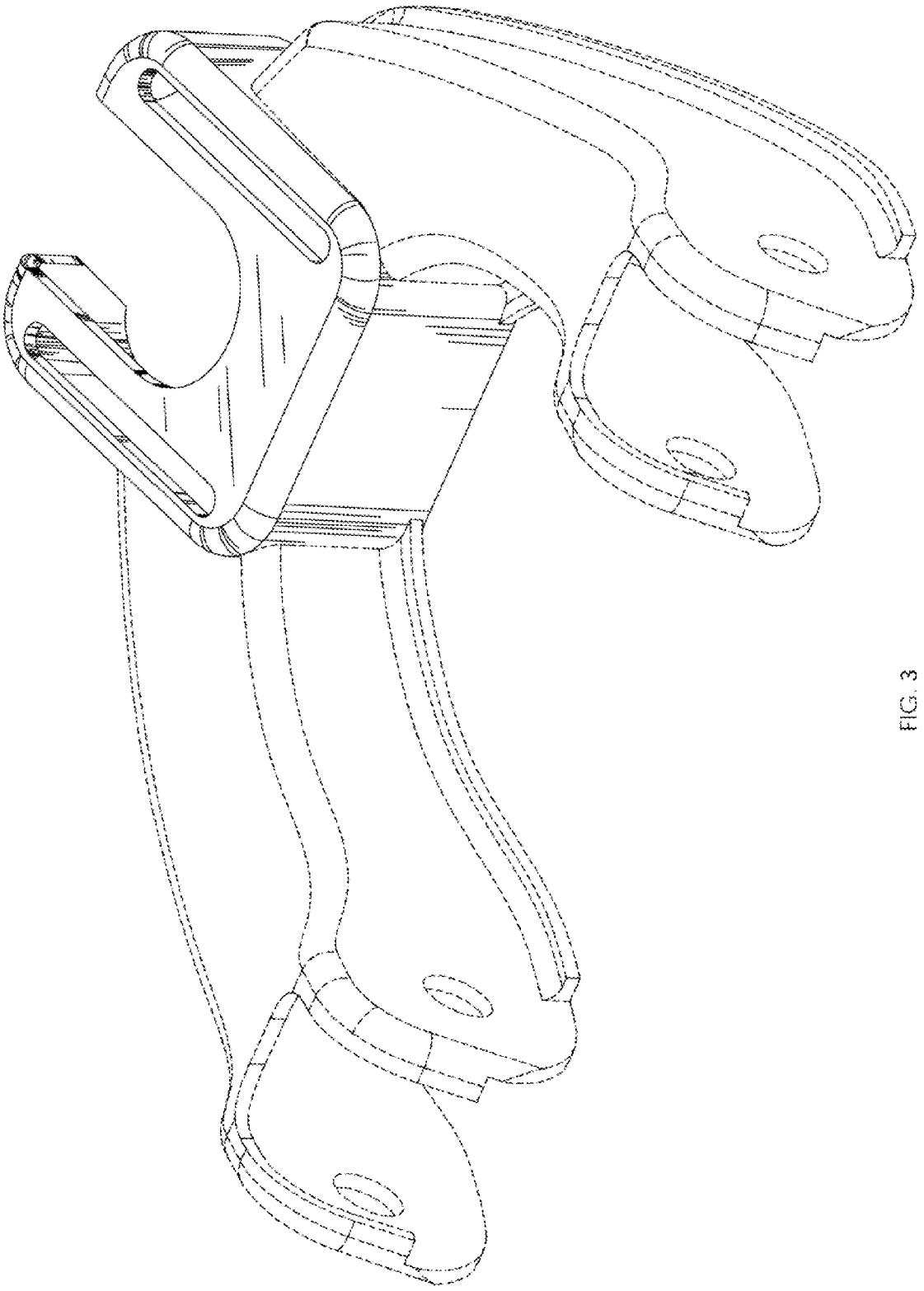


FIG. 3

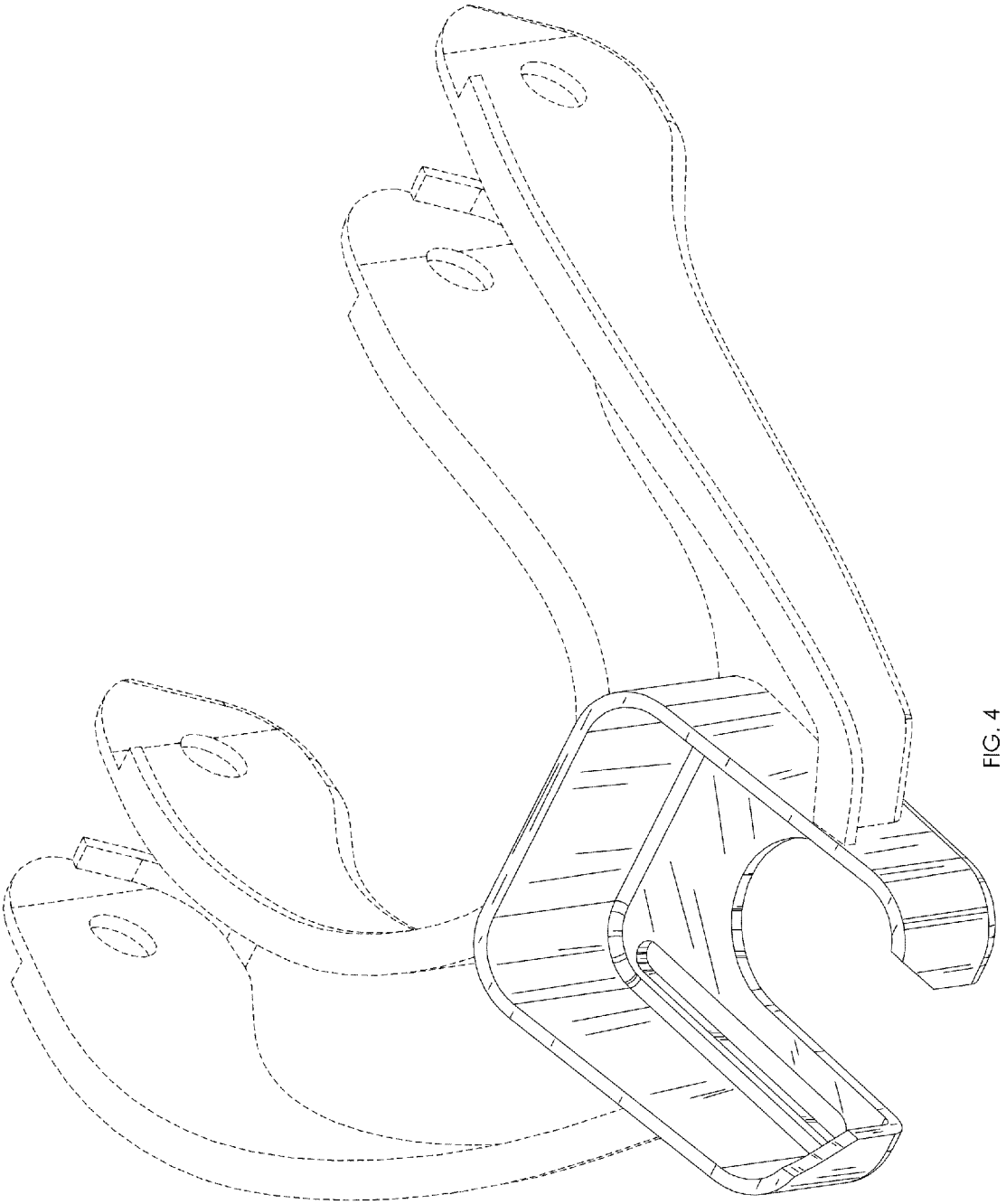


FIG. 4

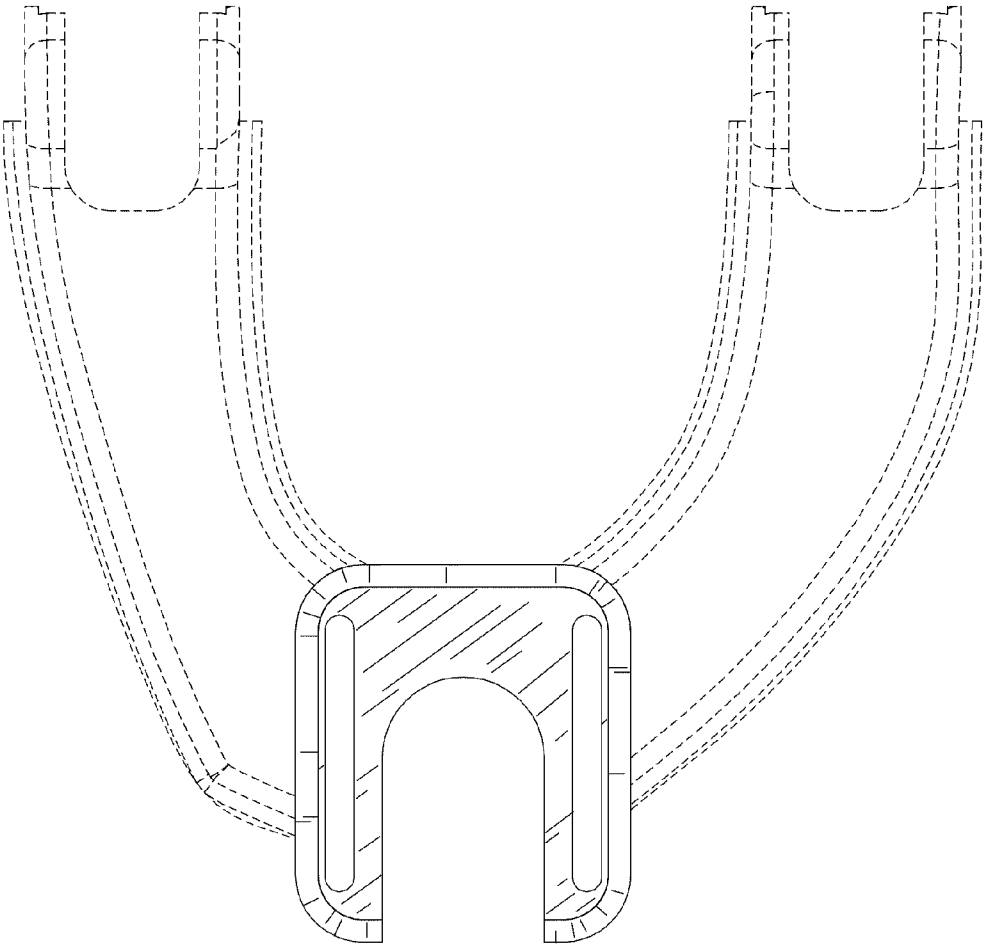


FIG. 5

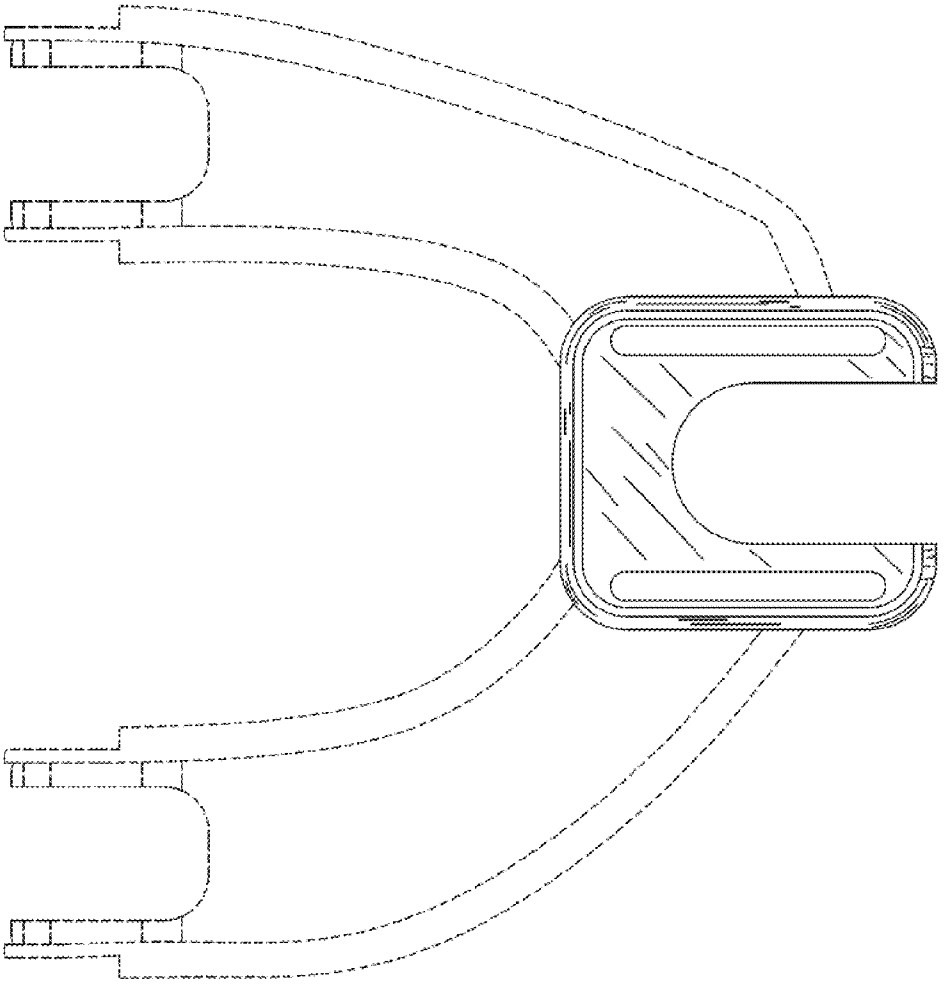


FIG. 6

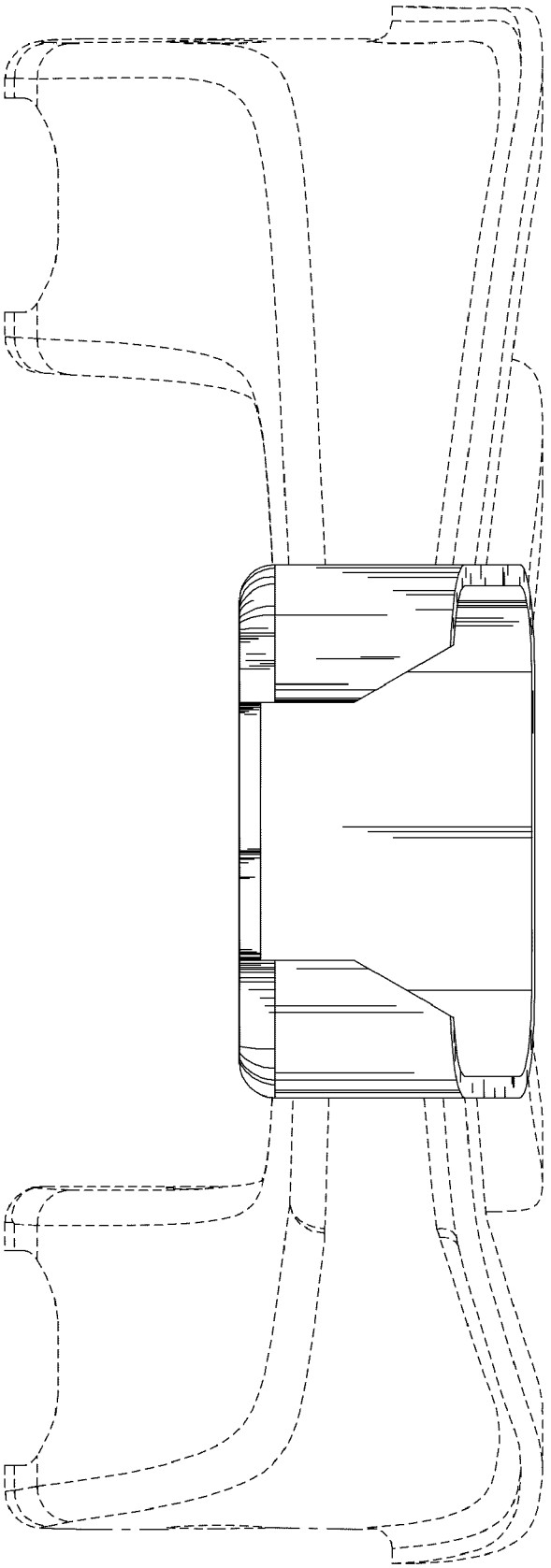


FIG. 7

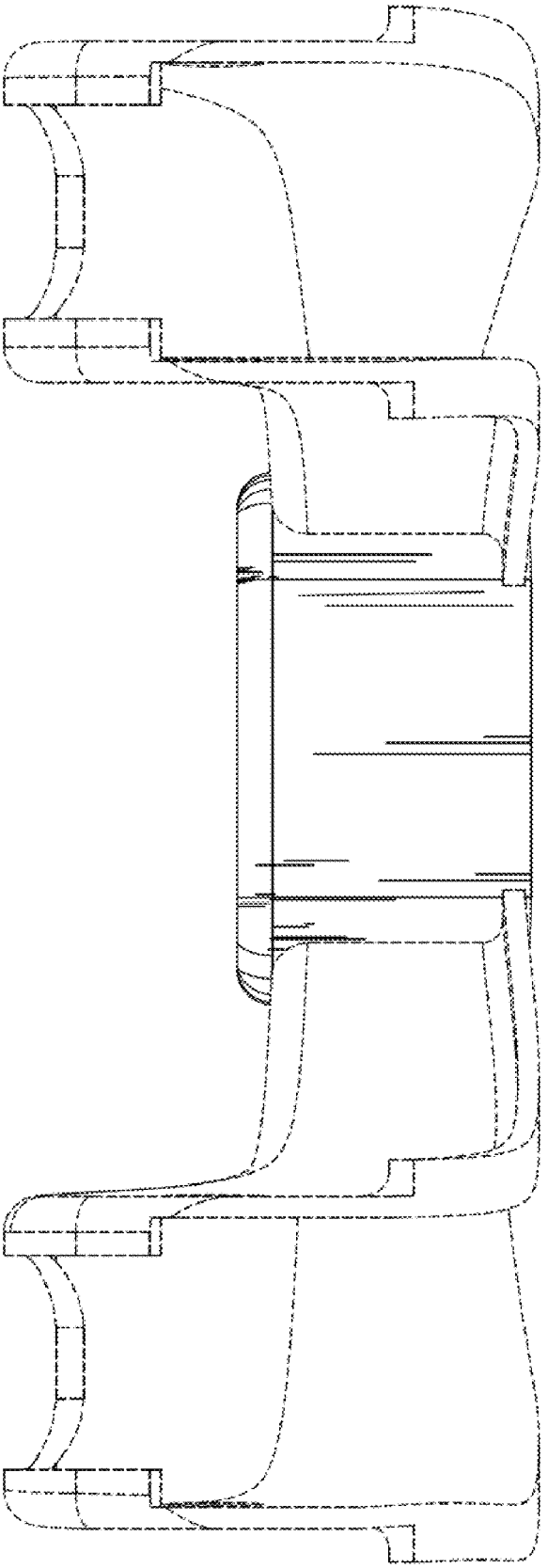


FIG. 8

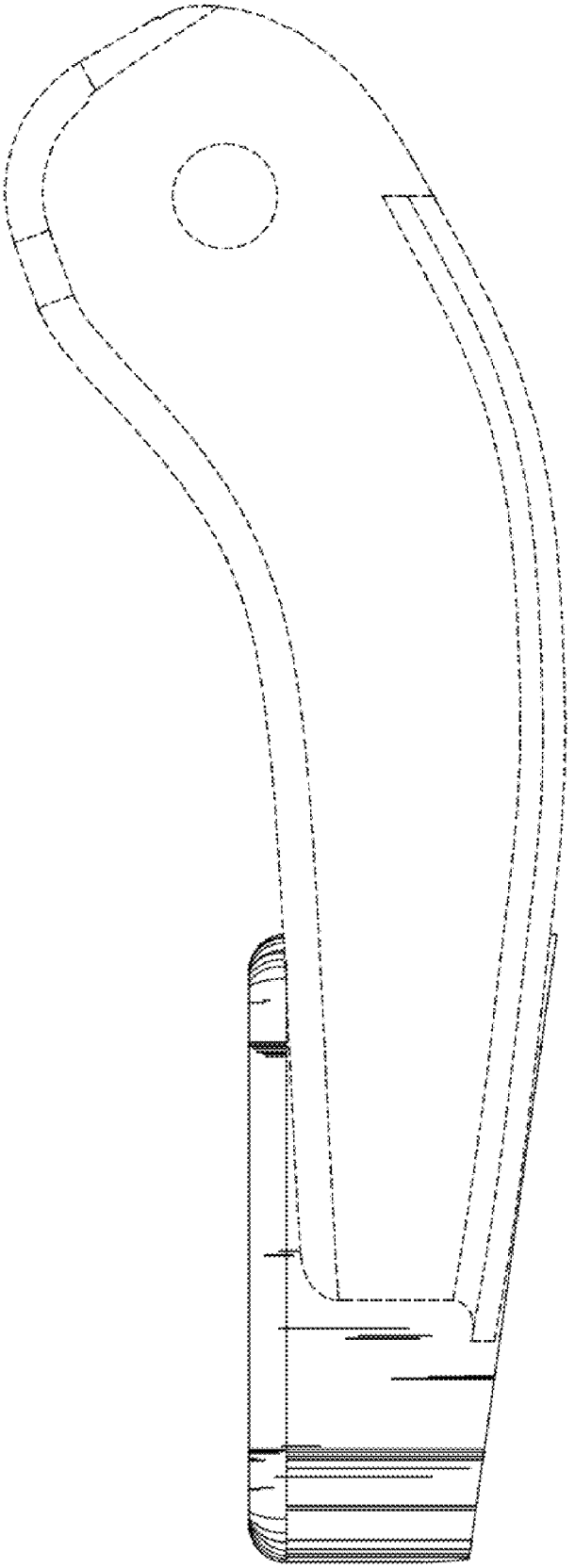


FIG. 9

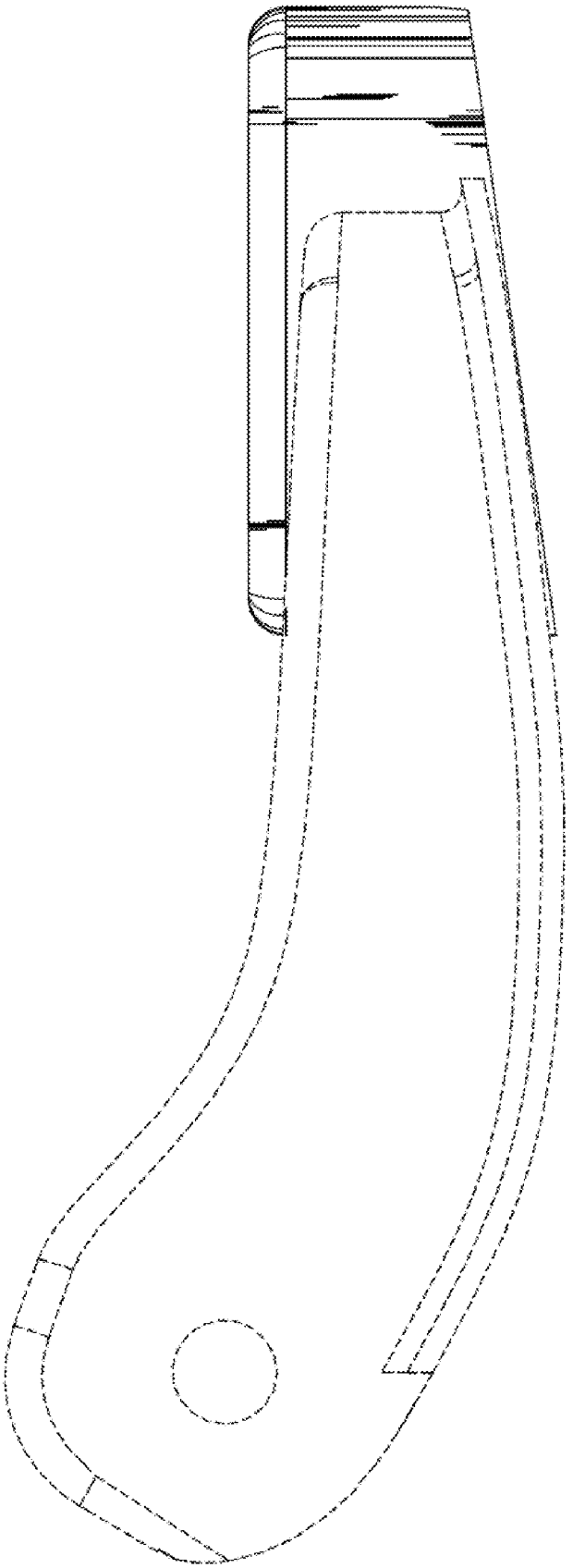


FIG. 10

EXHIBIT D - U.S. Patent No. D624,460

US00D624460S

(12) United States Design Patent

Hsu

(10) Patent No.: US D624,460 S
(45) Date of Patent: ** Sep. 28, 2010

(54) **PORTION OF A CLAMPING PLATE**

(75) Inventor: **David Hsu**, Norco, CA (US)

(73) Assignee: **Group-A Autosports, Inc.**, Norco, CA (US)

(**) Term: **14 Years**

(21) Appl. No.: **29/323,438**

(22) Filed: **Aug. 26, 2008**

(51) **LOC (9) Cl.** **12-16**
(52) **U.S. Cl.** **D12/159**
(58) **Field of Classification Search** D12/159; 280/124.155, 124.147, 124.145, 124.146, 280/86.752, 11.225; 188/281, 298, 297, 188/315, 316, 274, 286; 267/195, 136, 64.15, 267/217; 464/173; D21/118, 400, 161, 159, D21/160; 293/134; 403/122
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,549,656 B2 * 6/2009 Bier 280/93.511

* cited by examiner

Primary Examiner—T. Chase Nelson
Assistant Examiner—Michael A Pratt

(74) *Attorney, Agent, or Firm*—Steven N. Fox, Esq.

(57) **CLAIM**

The ornamental design for a portion of a clamping plate, as shown and described.

DESCRIPTION

FIG. **1** is perspective view of the design according to the present invention;

FIG. **2** is perspective view of the design according to the present invention;

FIG. **3** is a top plan view of the design according to the present invention;

FIG. **4** is a front elevation view of the design according to the present invention;

FIG. **5** is a rear elevation view of the design according to the present invention;

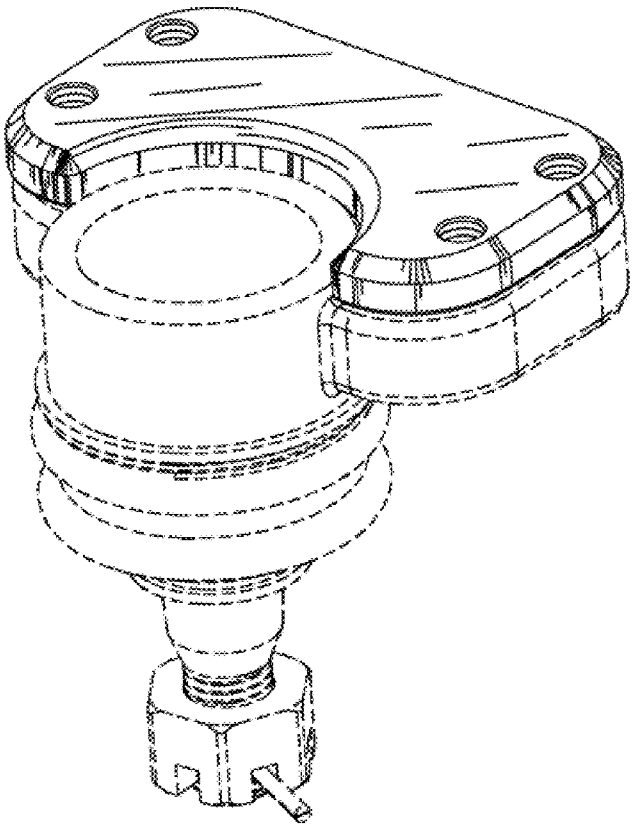
FIG. **6** is a left: side elevation view of the design according to the present invention;

FIG. **7** is a right side elevation view of the design according to the present invention; and,

FIG. **8** is a bottom plan view of the design according to the present invention.

The broken lines in the drawings are environmental and form no part of the claimed design.

1 Claim, 1 Drawing Sheet



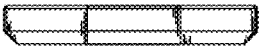


FIG. 7

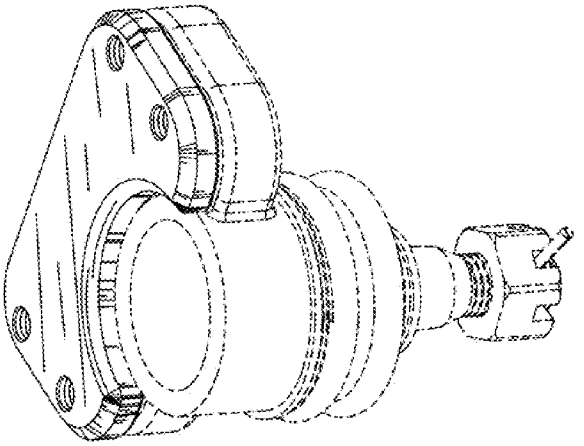


FIG. 1

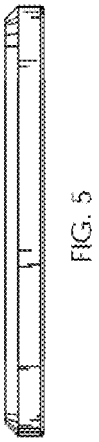


FIG. 5

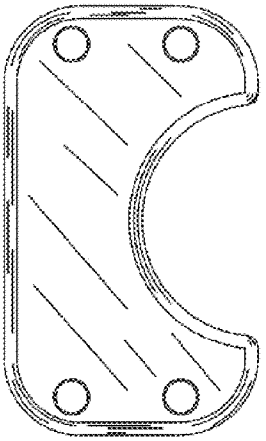


FIG. 3

FIG. 4

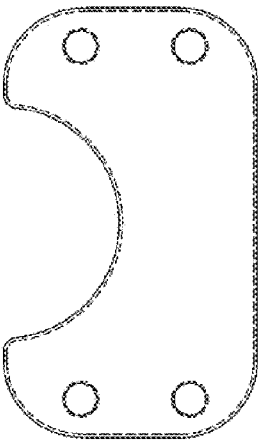


FIG. 8

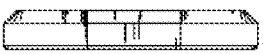


FIG. 6

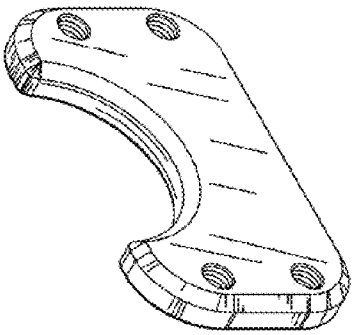


FIG. 2

EXHIBIT E - U.S. Patent No. D624,855

US00D624855S

(12) United States Design Patent

Hsu

(10) Patent No.: US D624,855 S
(45) Date of Patent: ** Oct. 5, 2010

(54) **PORTION OF A BALL JOINT ASSEMBLY**

(75) Inventor: **David Hsu**, Norco, CA (US)

(73) Assignee: **Group-A Autosports, Inc.**, Norco, CA (US)

(**) Term: **14 Years**

(21) Appl. No.: **29/323,600**

(22) Filed: **Aug. 27, 2008**

(51) **LOC (9) Cl.** **12-16**
(52) **U.S. Cl.** **D12/159**
(58) **Field of Classification Search** D12/159; 280/124.155, 124.147, 124.145, 124.146, 280/86.752, 11.225; 188/281, 298, 297, 188/315, 316, 274, 286; 267/195, 136, 64.15, 267/217; 464/173; D21/118, 400, 161, 159, D21/160; 293/134; 403/122
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,549,656 B2 * 6/2009 Bier 280/93.511

* cited by examiner

Primary Examiner—T. Chase Nelson
Assistant Examiner—Michael A Pratt
(74) *Attorney, Agent, or Firm*—Steven N. Fox, Esq.

(57) **CLAIM**

The ornamental design for a portion of a ball joint assembly, as shown and described.

DESCRIPTION

FIG. **1** is a perspective view of the design according to the present invention;

FIG. **2** is a perspective view of the design according to the present invention;

FIG. **3** is a perspective view of the design according to the present invention;

FIG. **4** is a top plan view of the design according to the present invention;

FIG. **5** is a front elevation view of the design according to the present invention;

FIG. **6** is a rear elevation view of the design according to the present invention;

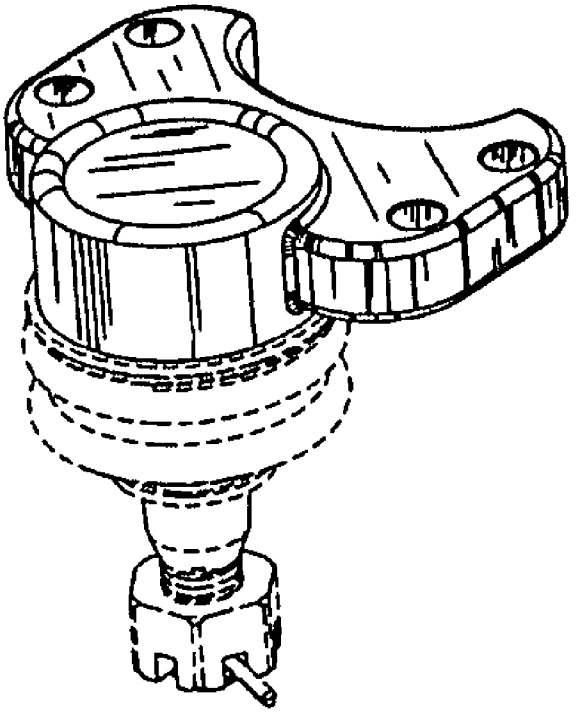
FIG. **7** is a left side elevation view of the design according to the present invention;

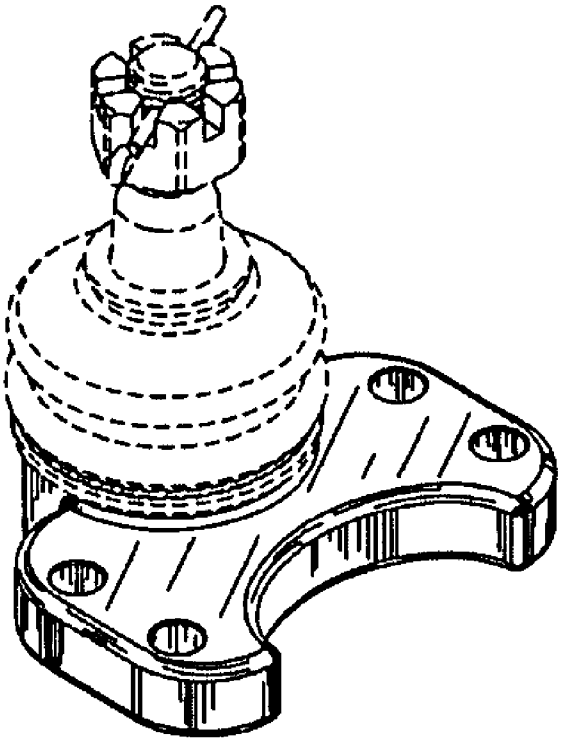
FIG. **8** is a right side elevation view of the design according to the present invention; and,

FIG. **9** is a bottom plan view of the design according to the present invention.

The broken lines in the drawings are environmental and form no part of the claimed design.

1 Claim, 1 Drawing Sheet





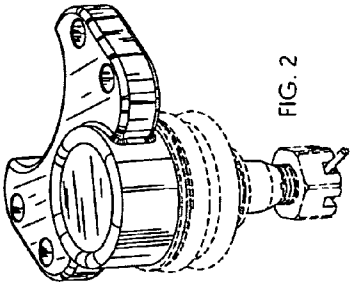


FIG. 2

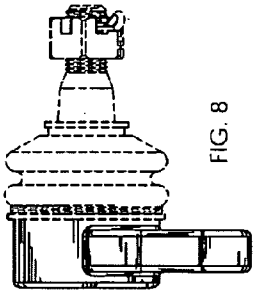


FIG. 8

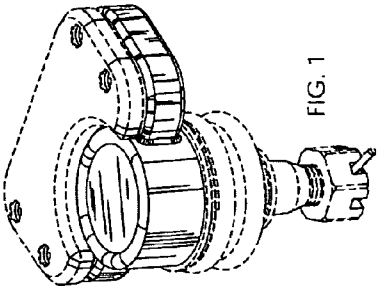


FIG. 1

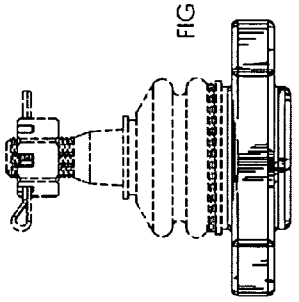


FIG. 6

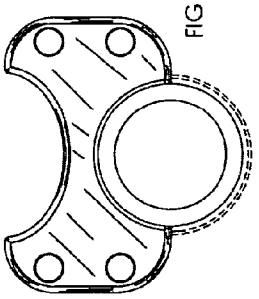
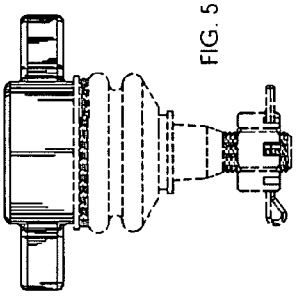


FIG. 4



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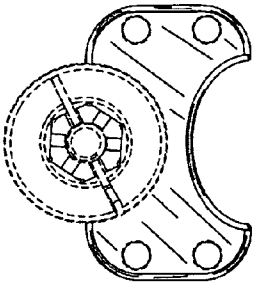

FIG. 9

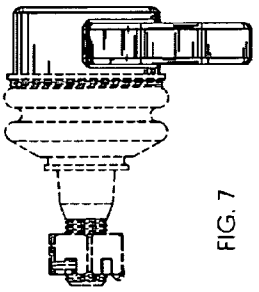

FIG. 7

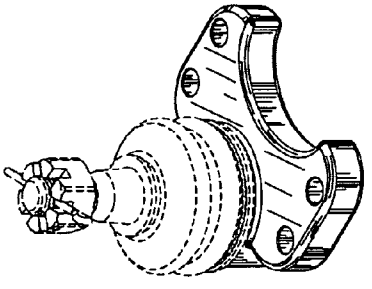

FIG. 3

EXHIBIT F - Plaintiff's Genuine Camber Arm

More Views

'90-'93 Integra Pro Series Front Camber Kit
516-05-5650

Like Share 4

Part Number Fits:
1990 - 1993 Acura Integra (GS, LS, RS)
1992 - 1993 Acura Integra (GS-R)

Note:
Sold in pairs.
Pro Series Front Camber Kits feature the most innovative, durable ball joints available. No other ball joint lasts as long, performs as well, or offers as much clearance for dramatically lowered vehicles.

US Patent No.: D602,408 S
US Patent No.: 8, 267, 413 B1

Status: **In Stock**
Size: 17 x 11 x 5 in.
Weight: 7 lbs

Email to a Friend
Be the first to review this product

$217.34 Qty: 1 Buy Now Add to Wishlist

Product Description

The adjustable camber kit second-generation Integra owners have been waiting for is finally here—Skunk2's all-new Pro Series Front Camber Kit.

Skunk2 designed its Pro Series Front Camber Kit for the '90-'93 Integra with specially engineered A-arms and ball joints that allow for maximum positive camber adjustment in a low-profile design. Enthusiasts who are serious about performance can now correct almost all abnormal tire wear due to negative camber and increase high-speed stability.

Each Pro Series Camber Kit includes Skunk2's all-new, one-piece, forged Pro Series Ball Joints, which feature low-profile top plates for additional clearance between themselves and the shock towers, higher clamping loads for no-slip performance, and a unique design that ... [Read more ⇩]

Additional Resources FAQ Testimonials & Reviews Related Products (1)

Technology - Product Design and R&D

Product Design and R&D

Since 1994, Skunk2's led the industry with cutting-edge designs, technology, and race-proven products. Our extensive R&D facilities allow us to produce the highest quality, best performing parts for your vehicle. Each Skunk2 product is designed with advanced 3D modeling software by Skunk2 engineers at our Southern California headquarters. Leading-edge processes like Computational Fluid Dynamics and Finite Element Analysis ensure maximum performance and durability. Rapid prototyping allows us to quickly produce test versions of various products for further analysis. Prototypes are then tested using state-of-the-art dyno equipment and then proven on the race track. Finally, multi-axis CNC processes and precision welding are employed to produce the finest parts possible. ... [**Read more** →]

Our Racing Heritage

As part of Skunk2's commitment to developing the best parts possible, we've remained actively involved in various forms of motorsports through technical partnerships, sponsorships, as well as with our own race vehicles for more than 15 years. Since 1994, Skunk2's continued to secure a number of drag racing and road racing records and championships, including the title of the world's first 10-second naturally aspirated Honda. Racing provides us with the data necessary to produce high-performance parts that utilize innovative designs, advanced materials, and cutting-edge manufacturing methods. Today we continue our tradition of creating leading-edge products and subjecting them to rigorous tests, both on the track and the street. ... [**Read more** →]

Skunk2 How-To: Pro Series Front Camber Kit Installation

Skunk2's proven adjustable front camber kits have remained the industry standard for more than a decade. Now that you've made the right decision and chosen Skunk2, here's a close-up look at how to install yours. ... [**Read more** →]

Knowledge Base: Front Camber Kits

For more than a decade, Skunk2 has led the industry with its fully adjustable front camber kits. More enthusiasts choose Skunk2's adjustable camber kits because of innovations like our anti-slip design, durable forged ball joints, and an unprecedented amount of camber adjustment. Now learn about all three kits,

including Tuner Series, Pro Series, and Pro Series Plus, and find out what makes Skunk2 camber kits the best. ... [**Read more** →]

'90-'93 Integra Pro Series Front Camber Kit Review

Skunk2 designed its Pro Series Front Camber Kit for the '90-'93 Integra with specially engineered A-arms and ball joints that allow for maximum positive camber adjustment in a low-profile design. Enthusiasts who are serious about performance can now correct almost all abnormal tire wear due to negative camber and increase high-speed stability. ... [**Read more** →]

EXHIBIT G - Advertisement for 1st Infringing Camber Arm

J2 ENGINEERING 96-00 HODNA CIVIC SILVER ADJUSTABLE FRONT SUSPENSION CAMBER KIT

Item condition: **New**

Compatibility: See compatible vehicles

Quantity: 1 More than 10 available

Price: **US $137.99** or **$23 for 6 months†**

Buy It Now

Add to cart

Best Offer: Make Offer

Add to watch list

Add to collection

Free shipping | New condition | Experienced seller

Shipping: **FREE** Standard Shipping | See details
Item location: **Rowland Heights, California, United States**
Ships to: **Americas, Europe, Asia, Australia** See exclusions

Delivery: Estimated on or before **Wed. Dec. 24** to 02035

Payments: PayPal VISA

Credit Cards processed by PayPal

PayPal CREDIT

† No Payments + No Interest if paid in full in 6 months, a budget of $23/month Apply Now | See Terms

See details

Returns: 14 days money back, buyer pays return shipping | See details

Guarantee: | See details

Get the item you ordered or get your money back.
Covers your purchase price and original shipping.

Description | Shipping and payments

eBay item number: 181144357943

Seller assumes all responsibility for this listing.

Last updated on Nov 14, 2014 14:30:35 PST View all revisions

Item specifics

Condition:	New	OriginalSku:	J2-CBK-HC96-SL
Part Brand:	dnamotoring		

dnamotoring

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PERFORMANCE AUTO PARTS & ACCESSORIES

GALLERY | DESCRIPTION | PAYMENT | SHIPPING | RETURN | CONTACT

- CATBACK EXHAUSTS
- HEADERS
- INTERCOOLERS
- TURBO KITS
- TURBOCHARGERS
- LOWERING SPRINGS
- COILOVERS

SEE MORE ITEMS

J2 ENGINEERING 96-00 HODNA CIVIC SILVER ADJUSTABLE FRONT SUSPENSION CAMBER KIT









ITEM SKU: J2-CBK-HC96-S

[*] **PRODUCT DESCRIPTION**

J2 ENGINEERING ADJSUTABLE FRONT CAMBER KIT

When a car's suspension is upgraded with lowering springs, the result is a lower ride height, a more aggressive look, and better handling due to the lowered center of gravity. While those things are great improvements for the car, the tires suffers from increased wearing and tearing since the tires will slant inwards towards the inside fender. J2 Racing Camber Kits allow the car to remain at the lowered ride height while correcting the angle of the tire closer to the spec it was supposed to be.

- 100% Brand New; Never been Used or Tried On
- Made of High Quality CNC Machined Steel Alloy Material
- Corrects Camber +3.00 / - 3.00 Degrees and brings Quicker Response
- Design for Street, Track or Drift Racing Precise Adjustments with Long Service Life
- Improves Front Suspension, Handling, Predictable Response and even Prevents Premature Tire Wearing.
- Tires Wear more Evenly and Increases Traction and Handling by Ensuring Even or Desired Contact with the Ground
- Thicker and Stronger Lock Washers; Prevents Bolts from Getting Loose due to Engine Vibration and Road Conditions
- Hard Rubber Bushings for Extra Durability and Relativeness in Daily Driving or Tracking Racing
- OE Type Paint-Coated for the Highest Durability
- Direct Bolt-On Installation or Replacement
- No Instructions Included.
- Professional Installation is Highly Recommended

APPLICATION:

- 1996 - 2000 HONDA CIVIC EJ8 / EJ7 / EJ6 / EM1

** PROFESSIONAL INSTALLATIONS ONLY**

[*] RELATED PRODUCTS

[*] PAYMENT INFORMATION

- We accept PayPal payments. (e-check takes 3-7 business days to be processed. We will not ship until it is cleared)

Payment Options Overview:

PayPal VISA MasterCard AMERICAN EXPRESS DISCOVER BANK

[*] SHIPPING INFORMATION

- **Domestic Shipping** rates apply to all 48 contiguous states.
- **PR, HI, AK and PO Box addresses** shipping rates are the same as CANADA shipping.
- **US Territories and Military** such as **GU, VI, SAIPAN, APO/FPO** will be charegd the same as international shipping rate. Transaction will be held until a full shipping amount received.
- For **Canada shipping** please select **the lowest price**. We do not offer expedited shipping.
- **Some of the packages cannot be delivered to a PO Box.** Customer is responsible to ensure PO Box address given is deliverable by the shipping company. Package will be held until a valid physical address is provided.
- Items will be shipped 24 hours of payment verification.
- All international orders may be subject to their custom fees or brokerage fees or duty tax which we do not pay.

- All buyers must pay for their own customs fees or brokerage fees or duty tax.
- These fees vary due to price of item and government rate. Please contact your government website or shipping company to calculate fees.
- We are not responsible for any changed of address after item has been shipped.

IMPORTANT NOTICE:
We ship all our items either via UPS/FEDEX or USPS. If there is no specific request prior to purchasing, we will ship either method.

Very Important Shipping Policy:
We only could ship to the address that's stated on your PayPal account as the shipping address unless the correct address was stated on the PayPal notes section. E-mailing us after you have made payment does not count so please update your shipping address on PayPal before making a payment. Thanks.

[*] RETURN POLICIES

- 14 Days money back, please notify us within 14 days after you've received your purchased item.
- All return requests must be submitted through your Ebay account.
- You have to obtain a RMA (Return Merchandise Authorization) number from us, and have the RMA number written on the return package.
- Buyers pay for return shipping fee.
- Items to be returned must be in resalable condition.
- All returns are for refund ONLY. No exchange accepted.
- Returns for refund are subject to a 20% restocking fee.

Note: Most items DO NOT come with instruction of Installation otherwise stated above, the buyer are responsible of the installation. If item is questionable, please consult your local professional/mechanic before making purchase.

[*] CONTACT INFORMATION

Got any questions about this listing or the product that you've already purchased? Please feel free to contact us by using the ebay link "Ask seller a question" above, and also please notice that no emails will be replied during weekend and holidays.

DNA Motoring Business Hours: Monday - Friday, 10 AM to 5 PM (Pacific Time).

DNA Motoring Contact Phone: 1-626-965-8898

For emissions related items, please check your local jurisdiction for emission specific requirements before purchasing.

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NGINEERING FRONT+REAR CAMBER CONTROL KIT ARM 96-00 HONDA CIVIC EG EJ EM GOLD for Sale

Price: $194

This item has been shown 6 times.

Click HERE for more information about this part.

Buy Now

J2 ENGINEERING FRONT+REAR CAMBER CONTROL KIT ARM 96-00 HONDA CIVIC EG EJ EM GOLD

SKU: J2-CBK-F-HC88+J2-CBK-HC96-GD

J2 Engineering Adjustable High Strength Front Camber Kit

When a car's suspension is upgraded with lowering springs, the result is a lower ride height, a more aggressive look, and better handling due to the lowered center of gravity. While those things are great improvements for the car, the tires suffers from increased wearing and tearing since the tires will slant inwards towards the inside fender. A camber kit will allow the car to remain at the lowered

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2000 Honda Civic SI: 8.411 @ 175.320
Stephanie Eggum, Engine: B18C1, Turbos: GT42R 74mm Tires: Mickey Thompson

2003 Honda Civic ex: 8.680 @ 169.000
John Brown, Engine: b18c, Turbos: t72 Tires: gooyear

1990 Honda Civic DX Hatch: 9.200 @ 162.000
Jim, Engine: LS VTEC B18 LS Block and B16 Head, Turbos: T70 Tires: Full Slicks

1997 Honda Civic Coupe Dunlop NoLimit VTG: 9.439 @ 151.000
Witold Karalow, Engine: B16A, Turbos: GT40 Tires: M/T 28

1997 Honda Civic Coupe: 9.665 @ 150.000
Vogelsinger Sandor, Engine: B18B, Turbos: Garrett

ride height while correcting the angle of the tire closer to the spec it was supposed to be.

Features & Benefits:

- Made of High Quality Lightweight CNC Machined Steel Alloy Material with Anodized Aluminum Adjuster
- Corrects Camber +3.00 / - 3.00 Degrees and brings Quicker Response
- Improves Rear Suspension, Handling, Predictable Response and even Prevents Premature Tire Wearing.
- Ensure Even or Desired Contact with the Ground;
i.e. Tires Wear more Evenly and Increases Traction and Handling
- Thicker and Stronger Lock Washers; Prevents Bolts from Getting Loose due to Engine Vibration and Road Conditions
- Hard Rubber Bushings for Extra Durability and Relativeness in Daily Driving or Tracking Racing
- Features Low Profile Aluminum Top Plate for Additional Clearance and Higher Clamping Load for No-Slip Performance
- OE Type Paint-Coated for the Highest Durability
- Design for Street, Track or Drift Racing Precise Adjustments with Long Service Life
- Easy to Access Turn-Buckle Style Adjuster for Ease of Adjustment without the Need of Removal
- Direct Bolt-On Installation or Replacement

J2 Engineering Adjustable High Strength Rear Camber Kit

When a car's suspension is upgraded with lowering springs, the result is a lower ride height, a more aggressive look, and better handling due to the lowered center of gravity. While those things are great improvements for the car, the tires suffers from increased wearing and tearing since the tires will slant inwards towards the inside fender. A camber kit will allow the car to remain at the lowered ride height while correcting the angle of the tire closer to the spec it was supposed to be.

Features & Benefits:

- Made of High Quality Lightweight CNC Machined Steel Alloy Material
- Corrects Camber +4.00 / - 4.00 Degrees and brings Quicker Response
- Improves Rear Suspension, Handling, Predictable Response and even Prevents Premature Tire Wearing.
- Ensure Even or Desired Contact with the Ground;
i.e. Tires Wear more Evenly and Increases Traction and Handling
- OE Type Paint-Coated for the Highest Durability
- Design for Street, Track or Drift Racing Precise Adjustments with Long Service Life
- Direct Bolt-On Installation or Replacement

100% Brand New
Professional Installer is Highly Recommended

- No Instruction Included

Package Includes:

- 1 X Set (Right+Left) of Front Camber Kits
- 1 Set (Right+Left) Rear Camber Control Kits as Shown in the Picture Above

Application:

- 96-00 Honda Civic EJ8/ EJ7/ EJ6/ EM1

Range of Adjustibility is Estimated on Trial, Actual Range depends on Applications

NOTE: Minor modifications or adjustments may be needed for some of our products. Installation instruction not included. Professional installation strongly recommended for high performance/racing automotive parts. Please excuse us from any possible typos and unintentional misinterpretations. You are more than welcome to contact us for questions and concerns. Thank you!

-30 Days money back, please notify us within30 days after you've received your purchased item.
- All return requests must be submitted through your account.
- You have to obtain a RMA (Return Merchandise Authorization) number from us, and have the RMA number written on the return package.
- Buyers pay for return shipping fee.

Tires: Yokohama,M/T

1995 Honda Civic vx hatchback: 9.680 @ 155.000
kyle, Engine: b18c1, Turbos: garrett gt4294r Tires: 24.5x8.5x13 m&h slicks

2007 Honda Civic 8th Civic SI: 9.849 @ 155.960
Everton Carvalho, Engine: K24, Turbos: GTX4202 Tires: M/T 24,5x8

1992 Honda Civic CX: 9.870 @ 145.660
Alexei Guinitaran, Engine: 1.8 L, Turbos: 60-1 Tires: M/T 24.5 x 9

1993 Honda Civic Street all motor : 9.871 @ 138.833
Adel tuning, Engine: drag cartel k26,

1998 Honda Civic Turbocharger: 9.930 @ 142.190
Angela Proudfoot, Engine: B18, Turbos: Turbonetics custom

1994 Honda Civic Coupe: 9.980 @ 145.580
Angel Robles, Engine: 1.8 acura integra gs, Turbos: 60-1 Tires: m&h

1993 Honda Civic cx: 10.050 @ 144.440
joytech, Engine: b18c, Supercharger: n/a Turbos: gt40/ Tires: 24.5 x 9.5

1996 Honda Civic EX Coupe: 10.081 @ 146.430
Shannon, Engine: B18C, Turbos: GT40/35R

1993 Honda Civic cx: 10.200 @ 142.000
dean, Engine: 2.0L gsr, Turbos: ITS 62-1 Tires: 24.5x8.5x14

1992 Honda Civic si: 10.350 @ 141.000
jared wahl, Engine: b18c1 block guarded 82mm stock sleeves, Turbos: t70 Tires: mickythompson 24.5x8x13

1996 Honda Civic DX LS1: 10.395 @ 132.610
Travis Chaney, Engine: LS1, Tires: 26x10.50 Hoosiers

1994 Honda Civic Coupe: 10.400 @ 137.860
John Brown, Engine: 1.8 acura integra gs, Turbos: t3/t4 Tires: m&h

1986 Honda Civic SI, AH5: 10.416 @ 125.000
Jimmy Fernandez, Engine: B16a, Turbos: GARRETT T3/T4 60mm / 63mm Tires: FRONT full slick M/H / BACK 205/R50/15 KUMHO ECSTA

- Items to be returned must be in resalable condition.
- All returns are for refund ONLY. No exchange accepted.
- Returns for refund are subject to a 20% restocking fee.

- We accept the following payments: Paypal
- eChecks will be held until cleared.
- We are not responsible for any address changes after the payment has been made.
- Sales tax applies to California residents.
- VERY IMPORTANT: Please make sure you input the correct shipping information at checkout. We are not responsible for incorrect or undeliverable addresses.
- Shipping and handling for Continental US (48 contiguous states).
- Shipping to PR, HI, AK and PO Box addresses will be charged the same as shipping to Canada.
- US Territories and Military such as GU, VI, SAIPANwill be charegd the same as international shipping rate. Transaction will be held until a full shipping amount received. No APO/FPO address will be accepted or shipped.
- Some of the packages cannot be delivered to a PO Box. Customer is responsible to ensure PO Box address given is deliverable by the shipping company. Package will be held until a valid physical address is provided.
- Customer assumes shipping charges incurred in shipping to undeliverable address.
- International orders can check the shipment calculator on top to find out shipping costs. International buyers are responsible for all customs duties, taxes, and other applicable fees incurred by the countrys customs/border regulations. Please contact customs for more information.
- We ship 98% of all orders the same or next business day after payment received/cleared. Please understand that once orders are shipped, we cannot control the transit times thereafter. Most orders will ship via USPS First Class/Priority Mail or FedEx/UPS or the best suitable carrier for the specific size of the product.
- For Canada shipping please select the lowest price. We do notoffer expedited shipping.

- For emissions related items, please check with your local jurisdiction for emission specific requirements before purchasing.
- All items do not come with installation instruction unless otherwise specified.
- If item is questionable, please consult your local professional/mechanic before making purchase.
- Got any questions about this listing or the product that you've already purchased?
- Please feel free to contact us by using the link "Ask a question" above. Please notice that no emails will be replied during weekend and holidays.
- Product Business Hours: Monday - Friday, 10 AM to 6 PM (Pacific Time).

Buy Now

EXHIBIT H - Letter Dated October 30, 2014

FOX & ASSOCIATES
62 South Main Street
Sharon, MA 02067

Steven N. Fox, Esq.
Patents, Trademarks & Copyrights

Voice: 781-821-8920
Fax: 781-821-8919
sfox@foxpatent.com

October 30, 2014

VIA E-MAIL: james@dnamotoring.com

Mr. James Yeu
Sales Director
DNA Motor, Inc.
801 S. Sentous Street
City of Industry, CA 91748

Re: J2 Engineering Camber Arm - Infringement of U.S. Patent Nos. 8,267,413; 7,857,332; and D602,408
Our Docket No.: 2014-203

Dear Mr. Yeu:

We serve as counsel to Group-A Autosports, Inc. of Norco, California.

Our client is the owner of U.S. Patent Nos. 8,267,413; 7,857,332; and D602,408 attached hereto as Exhibits A, B, and C.

It has come to our client's attention that your company is offering for sale and/or selling gold and silver color camber arms as shown in Exhibit D attached hereto. Your company's import, manufacture, advertisement, offer for sale, and/or sale of these camber arms infringe U.S. Patent Nos. 8,267,413; 7,857,332; and/or D602,408.

To settle this matter, our client demands that your company immediately stop offering for sale and/or selling the infringing camber arms. Thereafter, our client requires an accounting of all purchases, sales, and inventory of the infringing camber arms, including commercial bills of lading and invoices. Upon our client's review of the accounting, it will require the execution of a mutually acceptable settlement agreement providing, among other things, that your company will not sell the infringing camber arms or any product that violates the patent rights; that your company will destroy all existing inventory; and that your company will pay our client a settlement amount as damages based upon the volume of infringing products sold.

Kindly provide your company's reply to this letter on or before Tuesday, November 4, 2014.

Very truly yours,

FOX & ASSOCIATES

/Steven N. Fox/
Steven N. Fox

EXHIBIT A - U.S. PATENT NO. 8,267,413

US008267413B1

(12) **United States Patent**
Hsu

(10) **Patent No.: US 8,267,413 B1**
(45) **Date of Patent: *Sep. 18, 2012**

(54) **CAMBER ARM AND BALL JOINT ASSEMBLY**

(75) Inventor: **David Hsu**, Norco, CA (US)

(73) Assignee: **Group-A Autosports, Inc.**, Norco, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 30 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/898,866**

(22) Filed: **Oct. 6, 2010**

Related U.S. Application Data

(63) Continuation of application No. 12/234,287, filed on Sep. 19, 2008, now Pat. No. 7,857,332.

(51) **Int. Cl.**
B62D 17/00 (2006.01)

(52) **U.S. Cl.** **280/86.757**; 280/86.751

(58) **Field of Classification Search** 280/5.521, 280/86.751, 86.757

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,857,332 B2 * 12/2010 Hsu 280/86.757

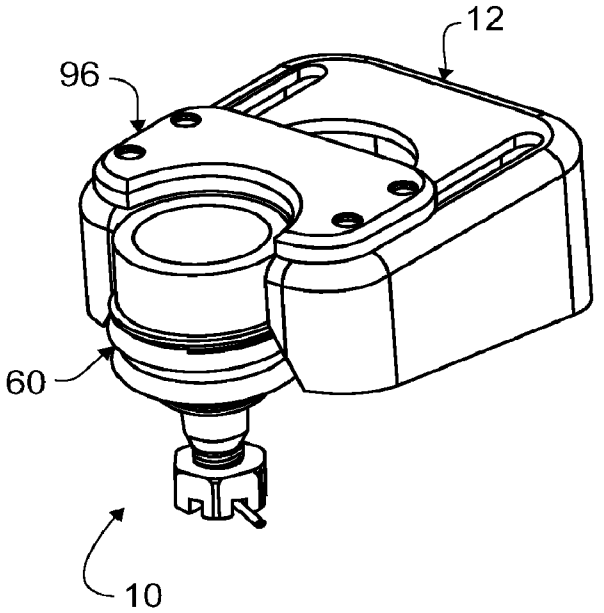
* cited by examiner

Primary Examiner — Paul N Dickson
Assistant Examiner — Laura Freedman
(74) *Attorney, Agent, or Firm* — Steven N. Fox, Esq.

(57) **ABSTRACT**

The present invention is a device for adjusting the camber angle of a tire/wheel assembly of a vehicle. The device comprises a camber arm having a cage. The cage comprises a cavity and front and top walls. The top wall comprises first and second slots. The cage further comprising a cut-out extending along the front and top walls. The device further comprises a ball joint assembly adjustably engaged with the cage. The device further comprises a fastener for securing the upper clamping plate to the lower clamping plate of the ball joint assembly. The ball joint assembly is adjustably moved along the first and second slots of the cage from a first position where the outward portion of the ball joint housing is disposed outside of the cavity of the cage and a second position where the outward portion of the ball joint housing is disposed within the cavity.

19 Claims, 15 Drawing Sheets



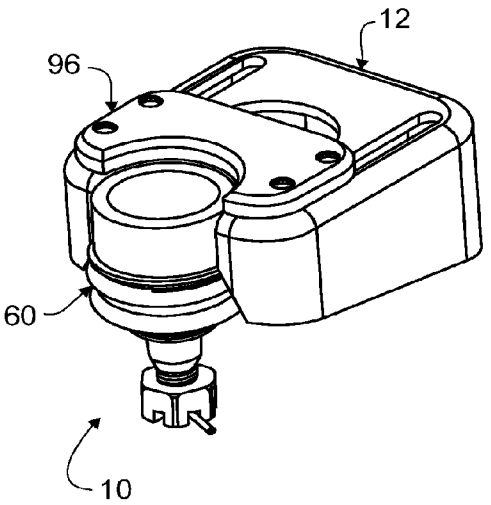


FIG. 1

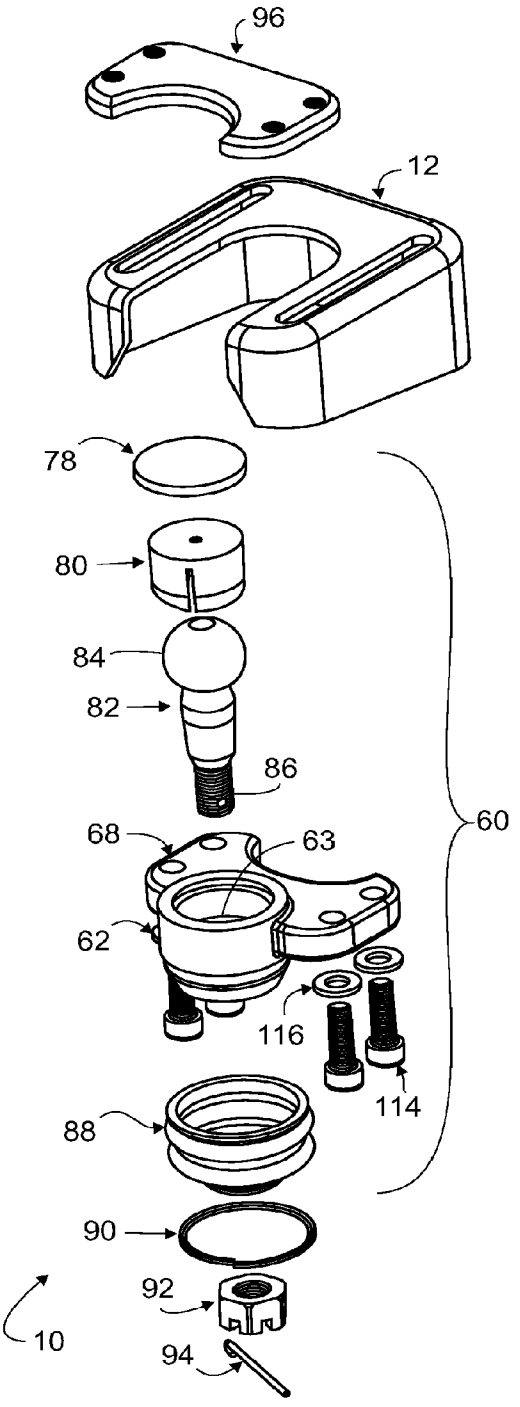


FIG. 2

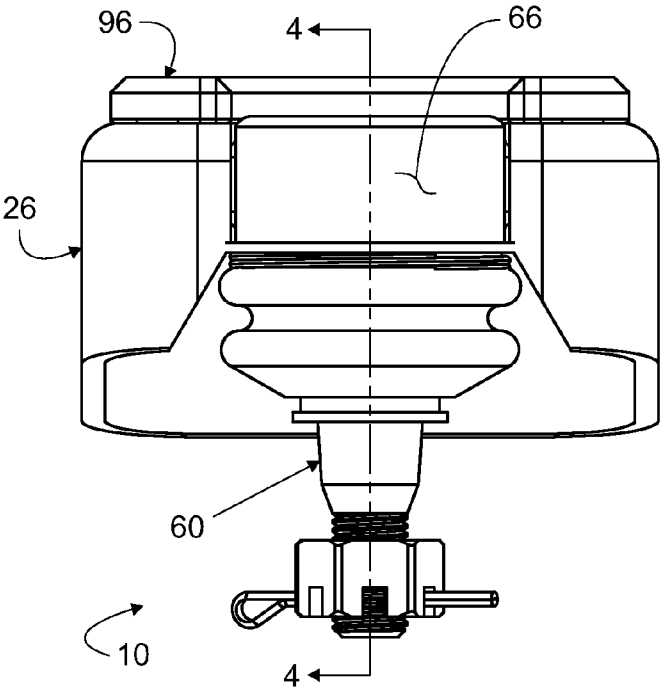


FIG. 3

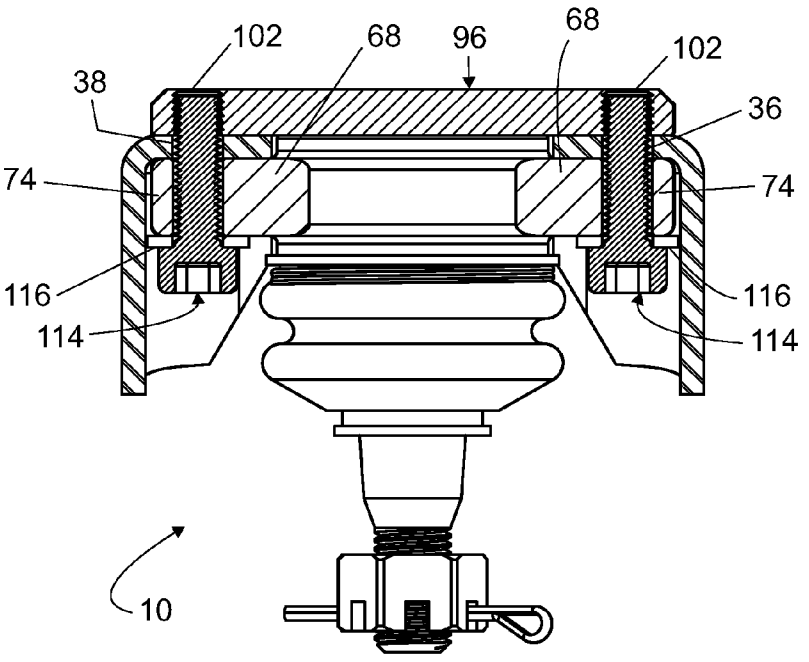


FIG. 5

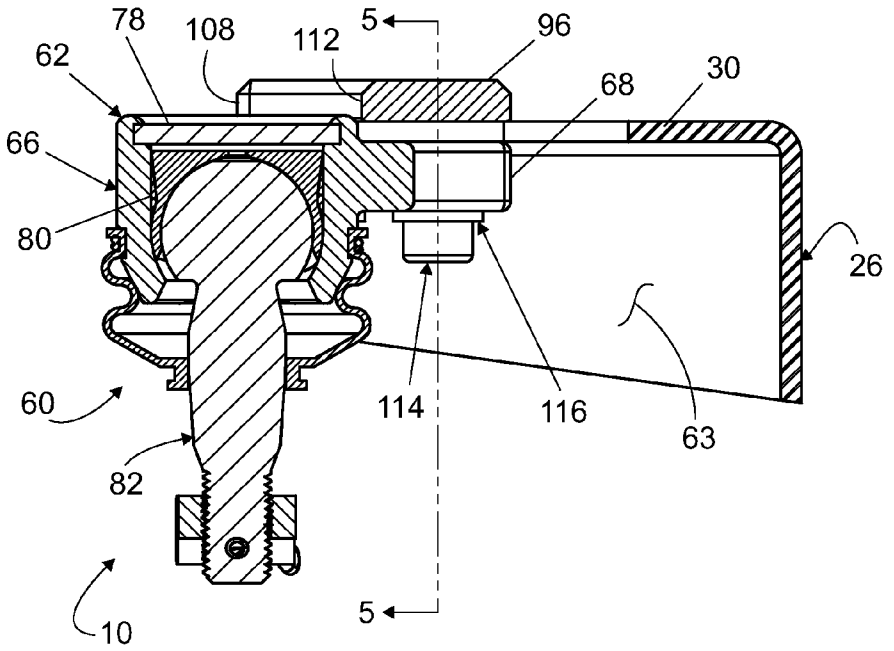


FIG. 4A

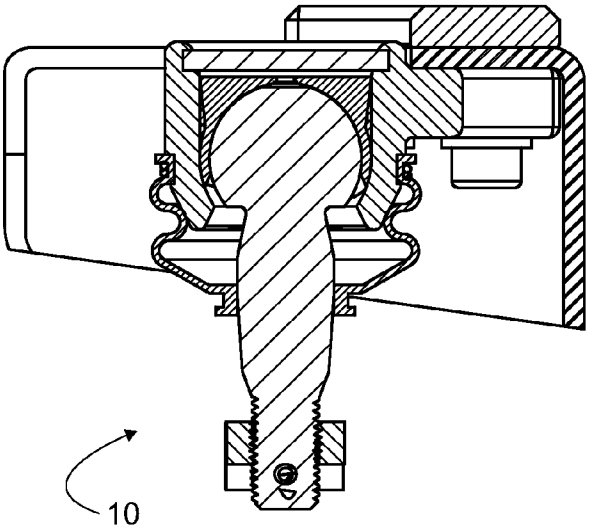


FIG. 4B

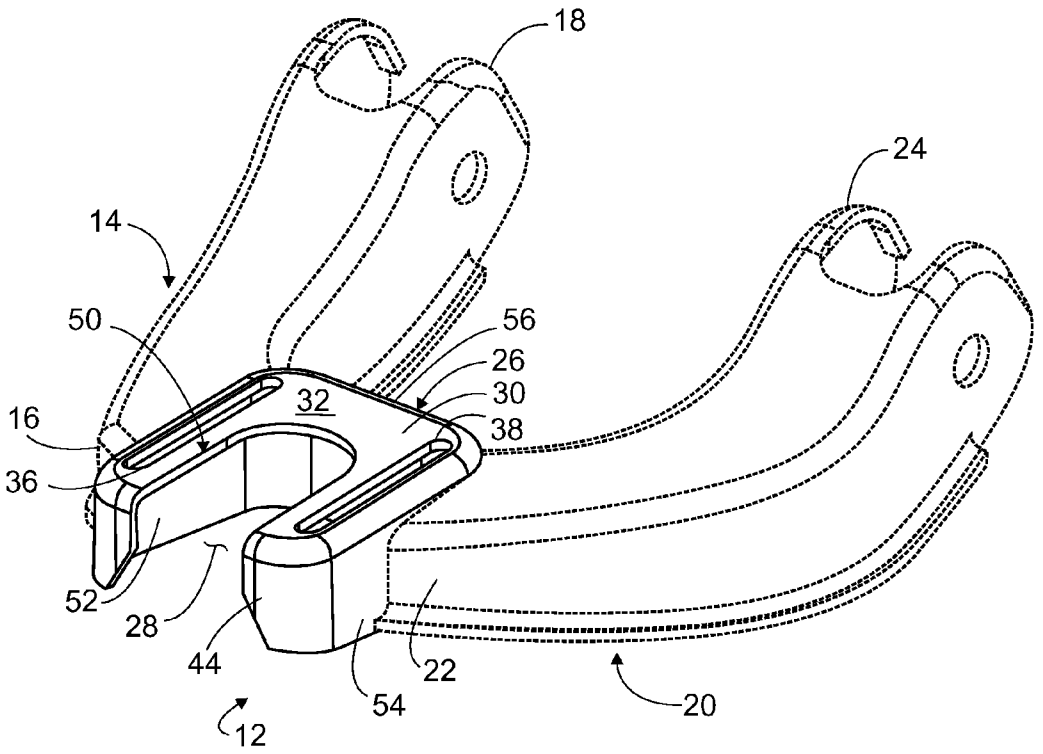


FIG. 6

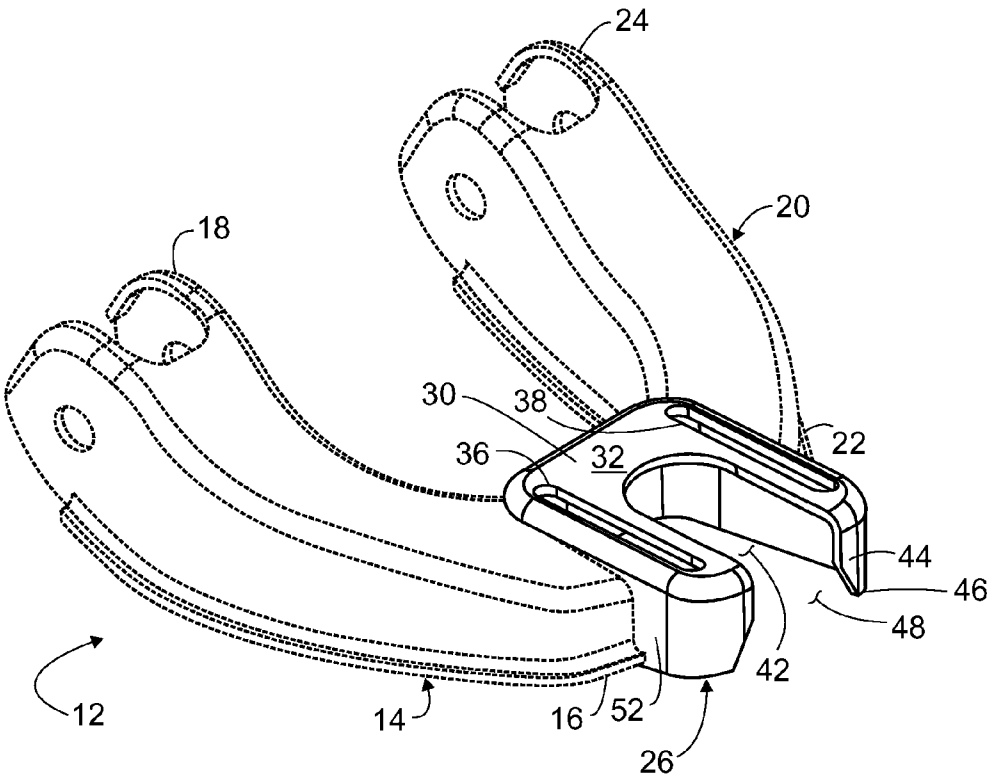


FIG. 7

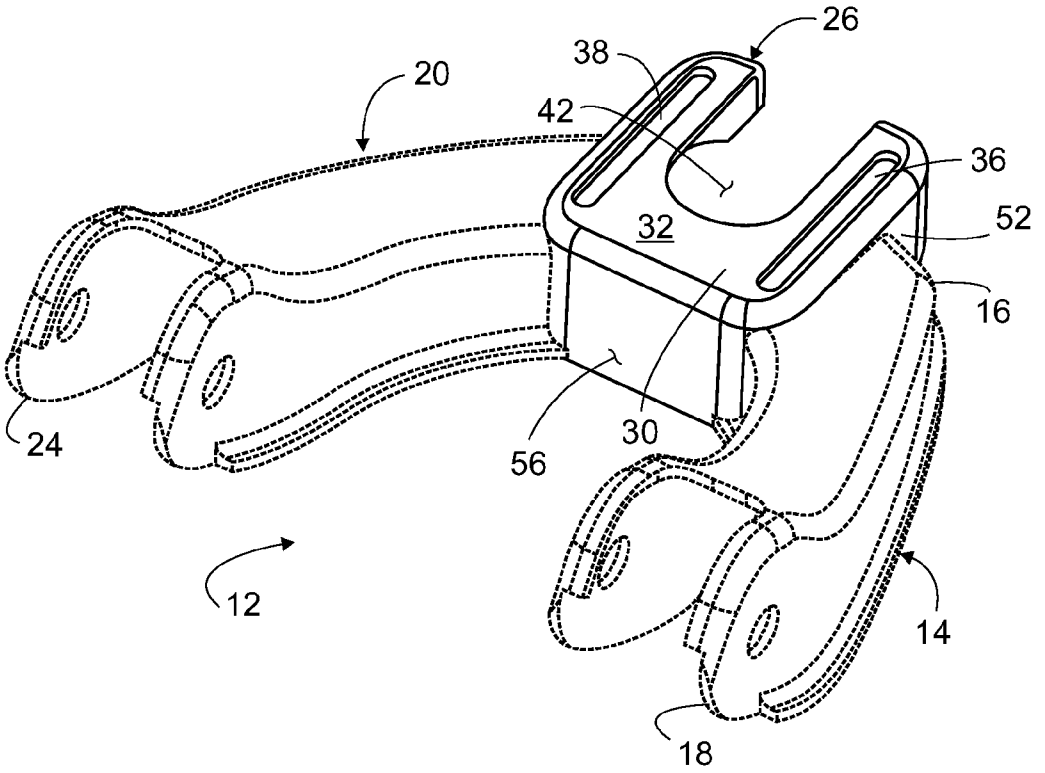


FIG. 8

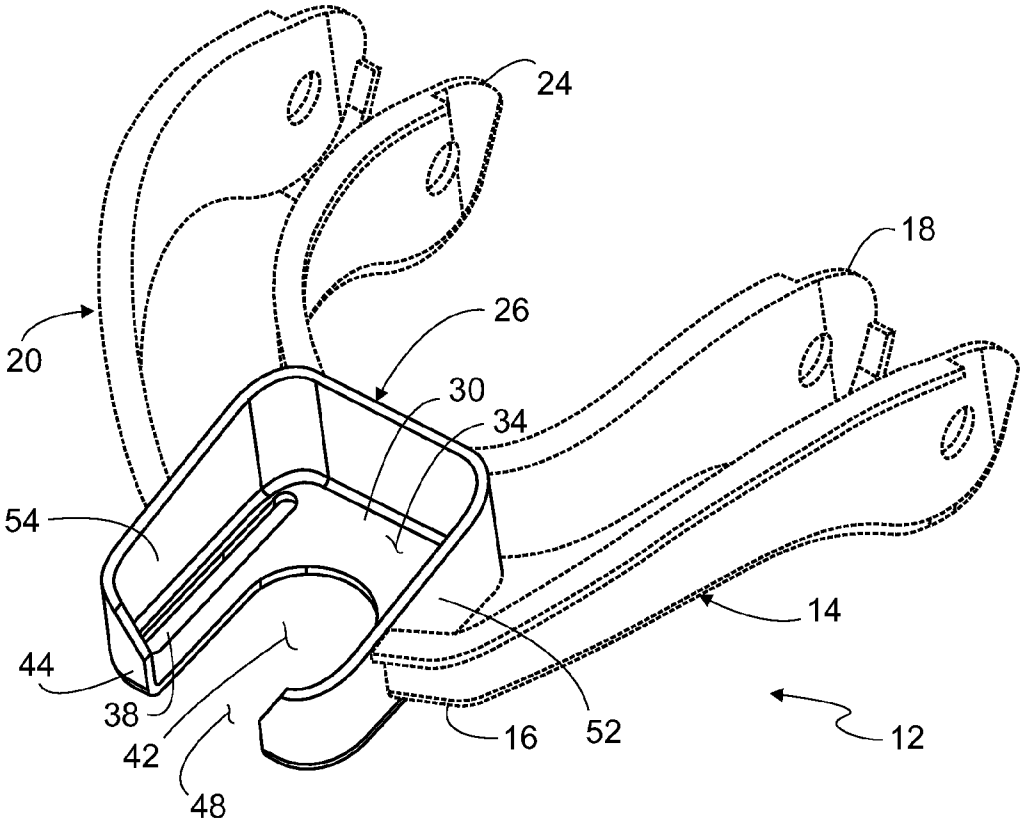


FIG. 9

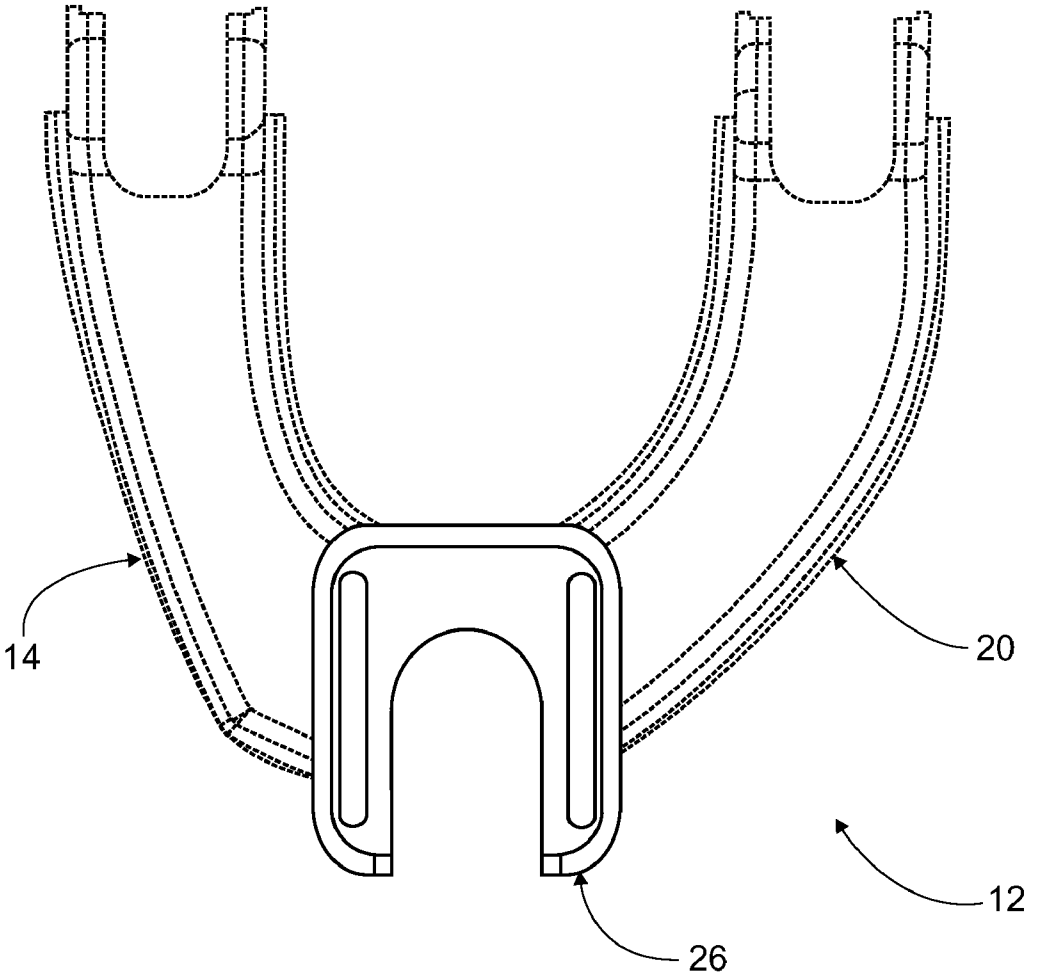


FIG. 10

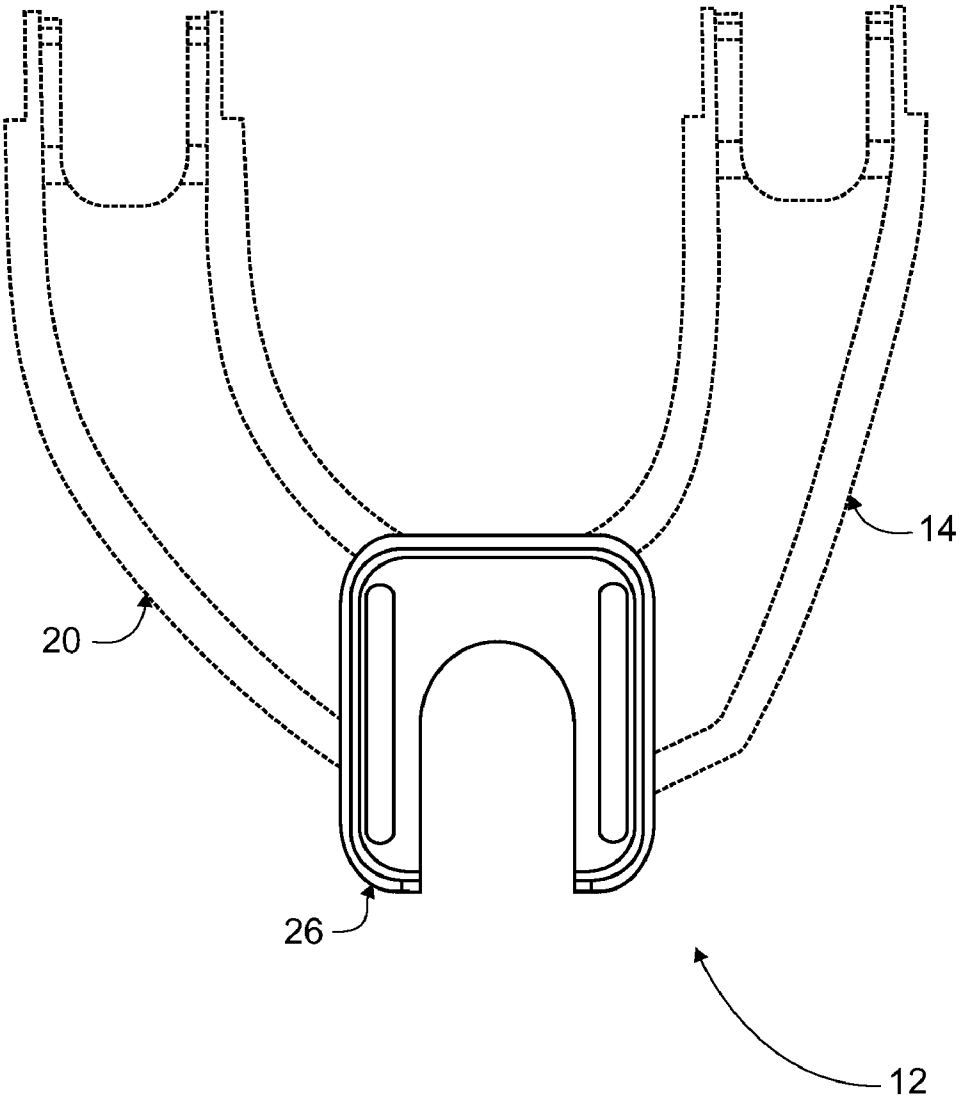


FIG. 11

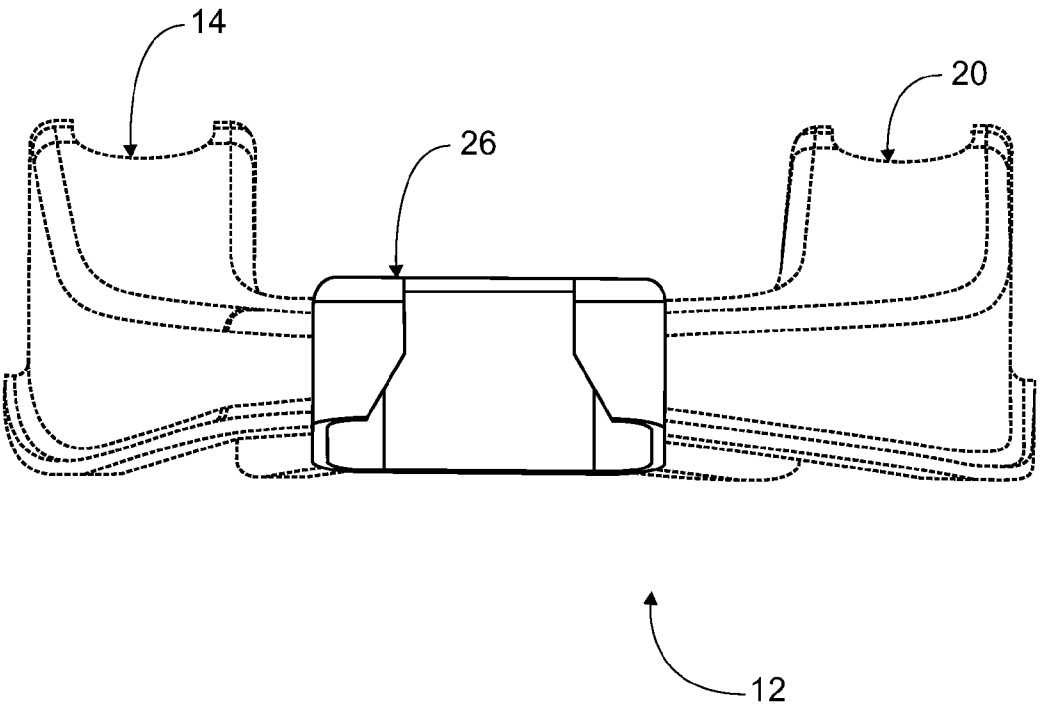


FIG. 12

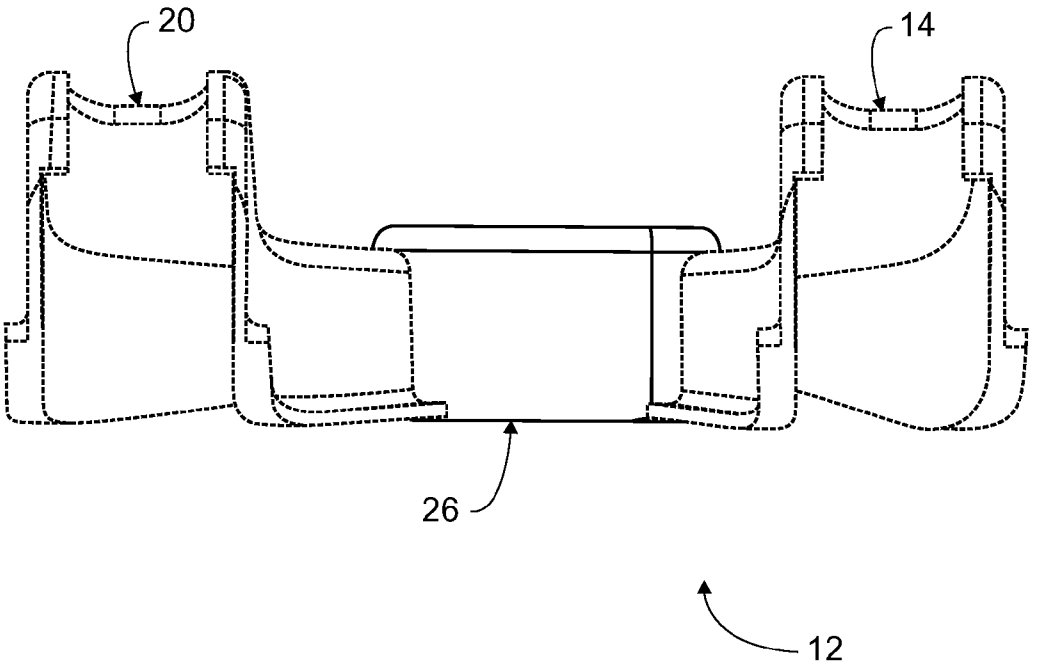


FIG. 13

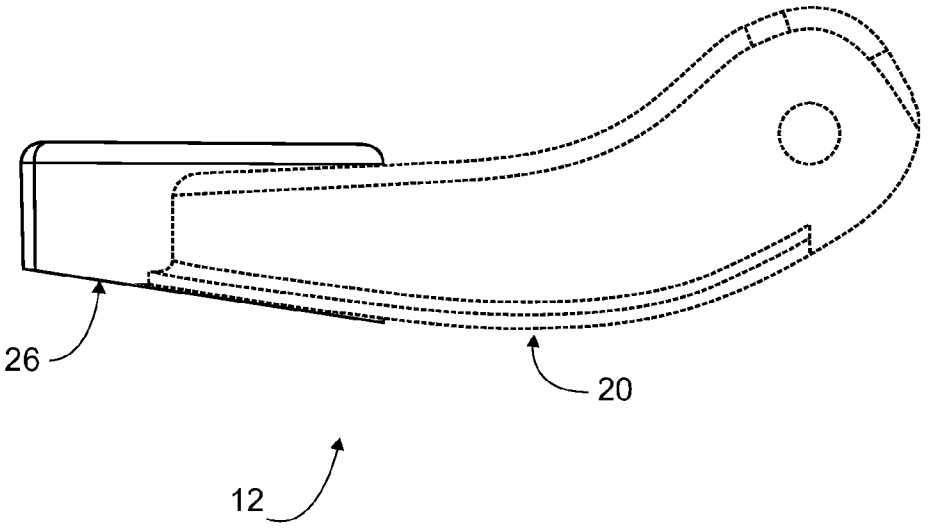


FIG. 14

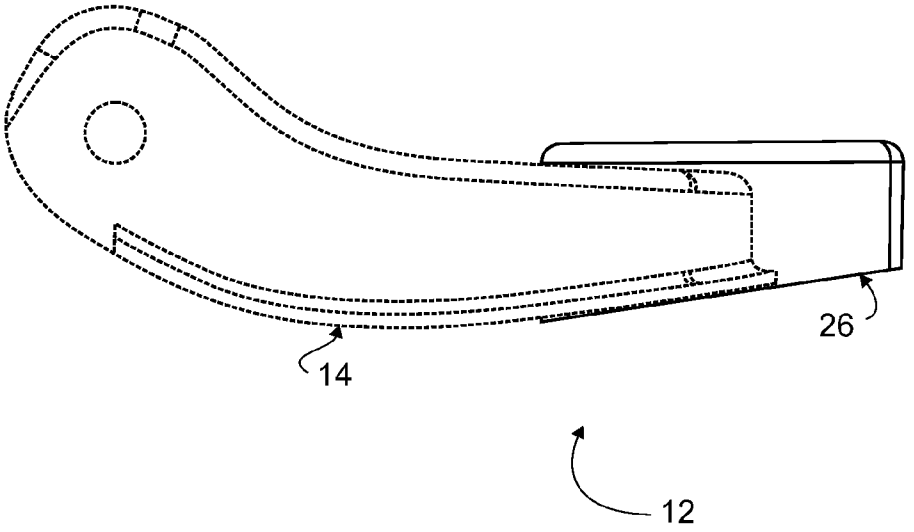


FIG. 15

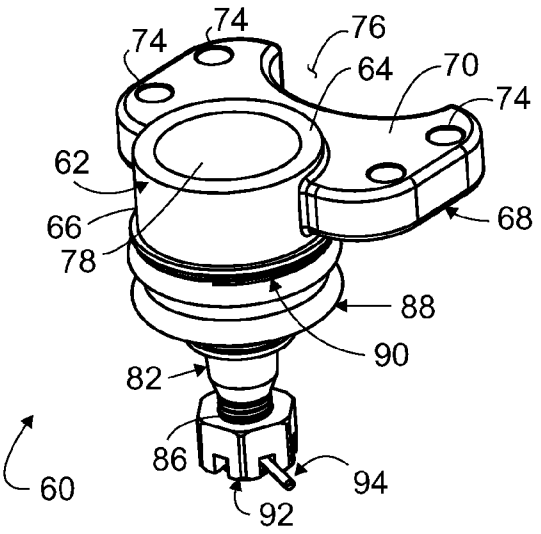

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FIG. 16

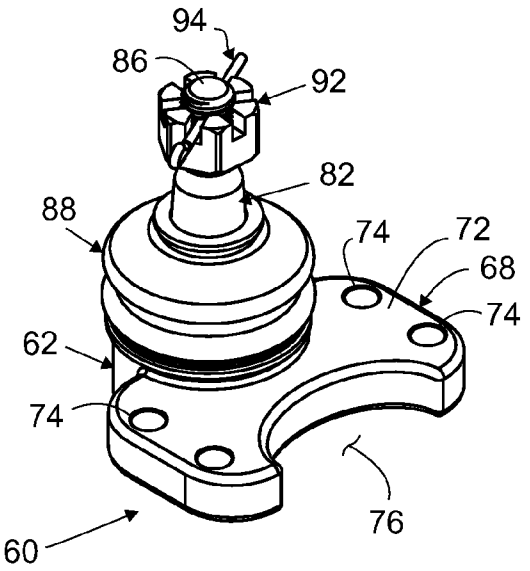
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FIG. 17

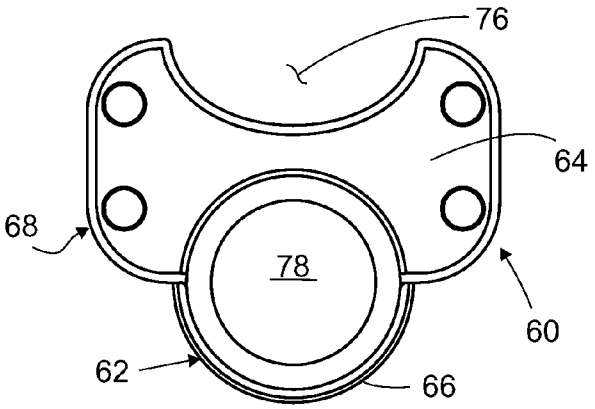
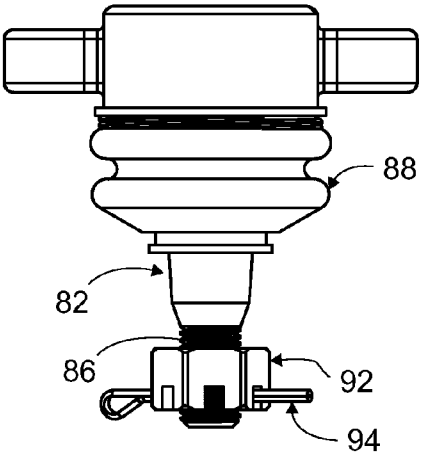


FIG. 18



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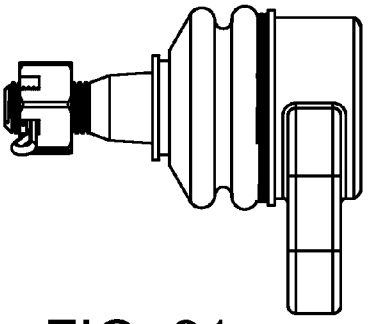


FIG. 21

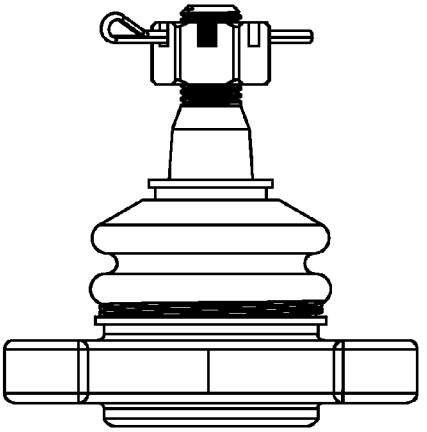


FIG. 20

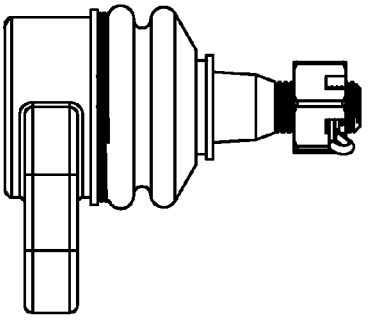
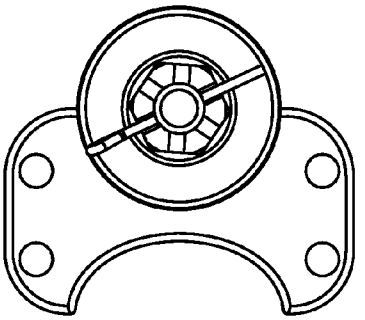


FIG. 22



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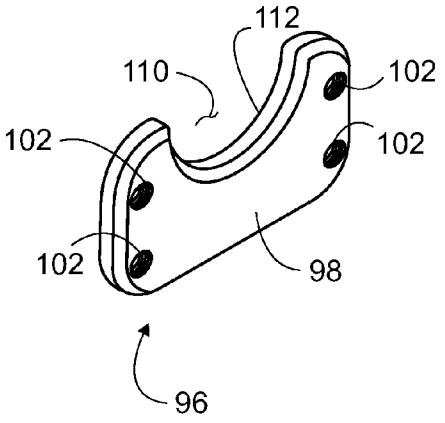


FIG. 24

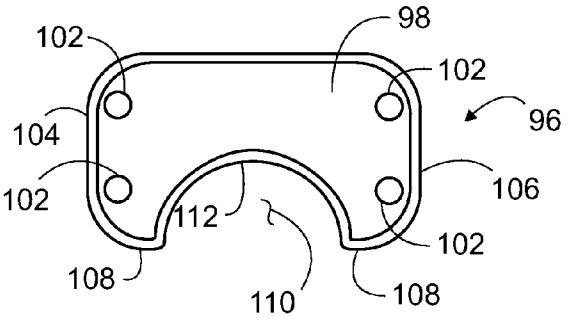
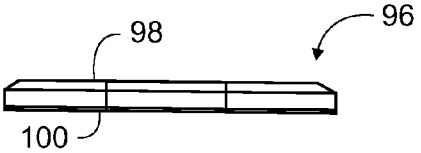


FIG. 25

FIG. 26



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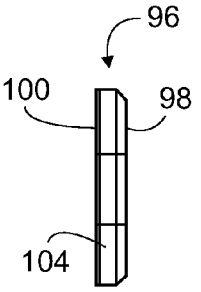

FIG. 28

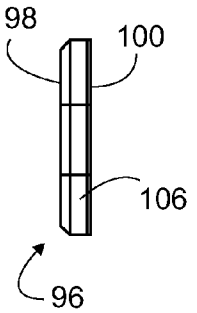

FIG. 29

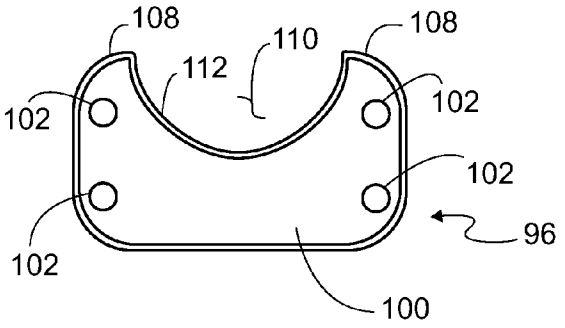

FIG. 30

CAMBER ARM AND BALL JOINT ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of application Ser. No. 12/234,287 filed on Sep. 19, 2008, now pending, which is hereby incorporated by reference in its entirety into this specification.

BACKGROUND OF THE INVENTION

A camber arm is used to adjust the camber angle of a tire/wheel assembly of a vehicle. The camber angle is the inward or outward tilt of the tire/wheel assembly and is measured from a true vertical line perpendicular to the ground. A tire/wheel assembly that is tilted outward at the top is considered to have positive camber. In contrast, a tire/wheel assembly tilted inward at the top is considered to have negative camber. For a zero setting, the tire/wheel assembly is in an exact vertical position or perpendicular to the ground. Positive camber results in a dynamic loading that allows the tire to run relatively flat against the road surface. Positive camber directs the weight and shock load of the vehicle on the larger inner wheel bearing and inboard portion of the spindle rather than the outboard bearing. A moderate positive camber results in longer bearing life, less likely sudden load failure, and easier steering. Excessive positive camber wears the outside of the tire and may cause wear to suspension pans such as wheel bearings and spindles. Negative camber on be used to improve the handling of a vehicle. A setting of ½° negative on both sides of a street car will improve cornering without affecting tire life greatly. This negative setting compensates for the slight positive camber change of the outside tire due to vehicle roll, thereby allowing a flatter tire contact patch during cornering. Excessive negative camber wears the inside of the tire and can cause wear and stress on suspension parts. Conventional devices do not allow the camber angle to be adjusted between a satisfactory range of positive and negative camber angles without failure under severe dynamic loads.

SUMMARY OF THE INVENTION

One object of the present invention is to provide a camber arm that allows the camber angle to be adjusted between a wider range of positive and negative camber angles without failure under severe dynamic loads.

The present invention is a device for adjusting the camber angle of a tire/wheel assembly of a vehicle. In one embodiment, the device comprises a camber arm having first and second arms and a cage. The cage comprises a cavity, a top wall, a front wall, and first and second sidewalls. The first and second arms are connected to the first and second sidewalls of the cage. The top wall comprises an outside surface, an inside surface, and first and second slots. The cage further comprising a cut-out extending along the front and top walls. The device further comprises a ball joint assembly adjustably engaged with the cage. The ball joint assembly comprises a ball joint housing and a lower clamping plate that is adjustably fastened to the inside surface of the top wall. The ball joint housing has an outward portion and an inward portion. The device further comprises an upper clamping plate having an outside surface, an inside surface, a plurality of mounting holes, a front edge portion, first and second side edge portions, and a cut-out having an inner edge portion. The cut-out extends inward from the front edge portion to the inner edge portion to allow access to the ball joint housing when assembled. The device further comprises a plurality of bolts for fastening the upper clamping plate and the lower clamping plate of the ball joint assembly to the top wall of the cage. The ball joint assembly may be adjustably moved within the first and second slots from a first position where the outward portion of the ball joint housing is disposed outside of the cavity of the cage and a second position where the outward portion of the ball joint housing is disposed within the cavity of the cage.

BRIEF DESCRIPTION OF THE DRAWINGS

The following detailed description of the invention will more fully understood with reference to the accompanying drawings wherein:

FIG. **1** is a perspective view of a camber arm assembly according to the present invention shown without left and right camber arms;

FIG. **2** is an exploded view of the camber arm assembly;

FIG. **3** is a front elevation view of the camber arm assembly;

FIG. **4**A is a cross-section view taken along line **4**-**4** of FIG. **3** showing the outward portion of the ball joint housing disposed outward of the cavity of the cage;

FIG. **4**B is a cross-section view taken along line **4**-**4** of FIG. **3** showing the outward portion of the ball joint housing disposed within the cavity of the cage;

FIG. **5** is a cross-section view taken along line **5**-**5** of FIG. **4**-A;

FIGS. **6** and **7** are top front perspective views of the camber arm;

FIG. **8** is a top rear perspective view of the camber arm;

FIG. **9** is a bottom front perspective view of the camber arm;

FIG. **10** is a top plan view of the camber arm;

FIG. **11** is a bottom plan view of the camber arm;

FIG. **12** is a front elevation view of the camber arm;

FIG. **13** is a rear elevation view of the camber arm;

FIG. **14** is a left side elevation view of the camber arm;

FIG. **15** is a right side elevation view of the camber arm;

FIG. **16** is a top perspective view of a ball joint assembly according to the present invention;

FIG. **17** is a bottom perspective view of the ball joint assembly;

FIG. **18** is a top plan view of the ball joint assembly;

FIG. **19** is a front elevation view of the ball joint assembly;

FIG. **20** is a rear elevation view of the ball joint assembly;

FIG. **21** is a left side elevation view of the ball joint assembly;

FIG. **22** is a right side elevation view of the ball joint assembly;

FIG. **23** is a bottom plan view of the ball joint assembly;

FIG. **24** is a top perspective view of an upper clamping plate according to the present invention;

FIG. **25** is a top plan view of the upper clamping plate;

FIG. **26** is a front elevation view of the upper clamping plate;

FIG. **27** is a rear elevation view of the upper clamping plate;

FIG. **28** is a left side elevation view of the upper clamping plate;

FIG. **29** is a right side elevation view of the upper clamping plate; and

FIG. **30** is a bottom plan view of the upper clamping plate.

DESCRIPTION OF THE INVENTION

Referring to FIGS. **1**-**2**, the present invention is a device **10** for adjusting the camber angle of a tire/wheel assembly (not

shown) of a vehicle. In one embodiment, device **10** generally comprises a camber arm assembly **12**, a ball joint assembly **60**, and an upper clamping plate **96**. For ease of illustration, left and right arms **14** and **20** (to be described) are not shown. Ball joint assembly **60** may be adjustably positioned on camber arm assembly **12** and secured thereto by upper clamping plate **96** and bolts **114** and washers **116**.

Referring to FIGS. **6-15**, camber arm assembly **12** generally comprises left and right arms **14** and **20**, and a central cage **26**. Left arm **14** generally comprises a first end portion **16** and a second end portion **18**. Right arm **20** generally comprises a first end portion **22** and a second end portion **24**. Cage **26** generally comprises a cavity **28**, a top wall **30**, a front wall **44**, first and second sidewalk **52** and **54**, and a rear wall **56**. Cage **26** further comprises a large cut-out **50** formed by a cut-out **42** (to be described) along top wall **30** and a cut-out **48** (to be described) along front wall **44**. Second end portions **18** and **24** of first and second arms **14** and **20** are adapted for connection to the chassis frame (not shown) of the vehicle. In the embodiment shown, end portions **16** and **22** of first and second arms **14** and **20** are secured to left and right sidewalls **52** and **54** (to be described) of cage **26**, respectively, by conventional means such as welding. Arms **14** and **20** may be of any desired shape and configuration based upon the chassis frame or other vehicle specifications. Top wall **30** of cage **26** comprises an outside surface **32**, an inside surface **34**, and first and second slots **36** and **38**; and a cut-out **42**. First and second slots **36** and **38** receive bolts **114** so that upper clamping plate **96** and lower clamping plate **68** of ball joint assembly **60** may be adjustably secured to and along top wall **30** of cage **26** by sliding the assembly within slots **36** and **38**. Front wall **44** comprises a bottom edge **46** and a cut-out **48**. Arms **14** and **20**, and cage **26** are made from steel and fabricated by conventional stamping and machining operations.

Referring to FIGS. **2** and **16-23**, ball joint assembly **60** comprises a ball joint housing **62** having a cavity **63**, an inward portion **64**, and an outward portion **66**. Ball joint assembly **60** further comprises a lower clamping plate **68** extending outward from inward portion **64**. Lower clamping plate **68** comprises an upper surface **70**, a lower surface **72**, mounting holes **74**, and a cut-out **76**. In the embodiment shown, mounting holes **74** are clearance holes to receive bolts **114** which are then threaded into mounting holes **102** (to be described) of upper clamping plate **96**. In other embodiments, mounting holes **74** may be threaded holes and mounting holes **102** (to be described) of upper clamping plate **96** may be clearance holes wherein bolts **114** would be inserted into clearance holes **102** (to be described) and then threaded into mounting holes **74**. Housing **62** and lower clamping plate **68** are made from steel and fabricated as a single cast piece by conventional casting and machining operations. As best shown by FIG. **2**, ball joint assembly **60** further comprises a ball joint **82** having a ball portion **84** and a threaded end portion **86**. Ball joint assembly **60** further comprises a plastic sleeve **80** and a housing cover **78**. Sleeve **80** is disposed about ball portion **84** of ball joint **82** and inserted within cavity **63** of ball joint housing **62** such that threaded end portion **86** extends downward out of cavity **63**. Cover **78** is removably engaged with ball joint housing **62** by a force-fit to enclose cavity **63**. Ball joint **82**, sleeve **80**, and housing cover **78** are well known in the industry and widely available. Ball joint assembly **60** further comprises a rubber dust boot **88** to prevent dust or other contamination from entering cavity **63** of ball joint housing **62**. Dust boot **88** is well known in the industry and widely available. Ball joint assembly **60** further comprises a locking ring **90** to retain dust boot **88** about ball joint housing **62**. Locking ring **90** is well known in the industry and widely available. Ball joint assembly **60** further comprises a castle nut **92** and a locking pin **94** to prevent the spindle or steering knuckle (not shown) from being disengaged from ball joint **82**. Nut **92** and locking pin **94** are well known in the industry and widely available.

Referring to FIGS. **24-30**, upper clamping plate **96** comprises an upper surface **98**, a lower surface **100**, and a plurality of threaded mounting holes **102** extending from upper surface **98** to lower surface **100**. Upper clamping plate **96** further comprises side edges portions **104** and **106**, a front edge portion **108**, and a cut-out **110** having an inner edge portion **112**. Cut-out **110** extends inward from front edge portion **108** to inner edge portion **112** to allow access to cover **78** of ball joint housing **62** when assembled. Upon assembly of upper clamping plate **96** to lower clamping, plate **68** of ball joint assembly **60**, inner edge portion **112** is substantially aligned and/or immediately adjacent or juxtaposed to inward portion of **64** of ball joint housing **62** thereby allowing a person access to cover **78** and cavity **63** to repair or replace ball joint **82** and/or sleeve **80**. Upper clamping plate **96** is made from steel and fabricated by conventional machining operations.

Referring to FIGS. **3-5**, bolts **114** and washers **116** securely fasten upper clamping plate **96** and lower clamping plate **68** of ball joint assembly **60** to top wall **30** of cage **26**. In the embodiment shown, lower surface **100** of upper clamping plate **95** is engaged with outside surface **32** of top wall **30** of cage **26**, and upper surface **70** of lowering clamping plate **68** of ball joint assembly **60** is engaged with inside surface **34** of to wall **30** of cage **26**. Alternatively, lower surface **72** of lowering clamping plate **68** of ball joint assembly **60** may be engaged with outside surface **32** of top wall **30** of cage **26**, and upper surface **98** of upper clamping plate **96** may be engaged with inside surface **34**, of top wall **30** of cage **26**. In either fastening configuration, ball joint assembly **60** may be adjustably moved anywhere between a first position where outward portion **66** of ball joint housing **62** is disposed outside of cavity **63** (FIG. **4**A) and a second position where outward portion **66** of ball joint housing **62** is disposed within cavity **63** (FIG. **4**B). As described heretofore, mounting holes **74** of lower clamping plate **68** are clearance holes to receive or allow passage of bolts **114** which are then inserted thru slots **36** and **38** of cage **26**, and then threaded into threaded mounting holes **102** of upper clamping plate **96**. In other embodiments, mounting holes **74** may be threaded holes and mounting holes **102** of upper clamping plate **96** may be clearance holes wherein bolts **114** would be inserted into clearance holes **102** and then threaded into mounting holes **74**.

The foregoing description is intended for purposes of illustration. The invention may be embodied in other forms or carried out in other ways without departing from the spirit or scope of the invention.

What is claimed:

1. A device for adjusting a camber angle of a tire/wheel assembly of a vehicle comprising:

a camber arm comprising a cage; said cage comprises a cavity, a top wall, a front wall, and first and second sidewalls; said top wall comprises an outside surface, an inside surface, and first and second slot portions; said cage further comprises a cut-out extending along said front and top walls;

a ball joint assembly adjustably engaged with said cage; said ball joint assembly comprising a ball joint housing having a centerline and a lower clamping plate; said ball joint housing having an outward portion and an inward portion;

an upper clamping plate;

a fastener for removably attaching said upper clamping plate and said lower clamping plate of said ball joint assembly to said top wall of said cage; and

whereby said ball joint assembly may be adjustably moved from a first position where said outward portion of said ball joint housing is disposed outside of said cavity to a second position where said outward portion of said ball joint housing is disposed within said cavity.

2. The device of claim **1**, wherein said cut-out of said cage extends substantially along said front and top walls.

3. The device of claim **2**, wherein said lower clamping plate comprising an upper surface, a lower surface, and a plurality of mounting holes.

4. The device of claim **3**, wherein said upper clamping plate comprises an upper surface, a lower surface, a plurality of mounting holes, a front edge portion, and a cut-out having an inner edge portion; said cut-out extending inward from said front edge portion to said inner edge portion to allow access to said ball joint housing when assembled.

5. The device of claim **4**, wherein said lower surface of said upper clamping plate is engaged with an outside surface of said top wall of said cage.

6. The device of claim **5**, wherein said upper surface of said lower clamping plate of said ball joint assembly is engaged with an inside surface of said top wall of said cage.

7. The device of claim **6**, wherein said cut-out of said cage is centrally disposed along said front and top walls of said cage.

8. The device of claim **7**, wherein said cut-out of said cage extends the full length of said front wall of said cage.

9. The device of claim **8**, wherein said upper clamping plate further comprises first and second side edges; said cut-out of said upper clamping plate being centrally disposed between said first and second side edges.

10. The device of claim **9**, wherein said cut-out of said upper clamping plate extends inwardly a distance at least one-half the length of said upper clamping plate.

11. The device of claim **10**, wherein said fastener comprises a plurality of bolts.

12. The device of claim **11**, wherein said mounting holes of said upper clamping plate are threaded holes and said mounting holes of said lower clamping plate of said ball joint assembly are clearance holes; and said plurality of bolts pass through said clearance holes of said lower clamping plate of said ball joint assembly, through said first and second slot portions of said top wall of said cage, and threaded with said threaded holes of said upper clamping plate.

13. The device of claim **12**, wherein said cut-out of said upper clamping plate is substantially the same shape as said inward portion of said ball joint housing.

14. The device of claim **13**, wherein said cut-out of said upper clamping plate is concave shaped.

15. The device of claim **14**, wherein said inward portion of said ball joint housing is convex shaped.

16. The device of claim **15**, wherein said first and second slot portions of said top wall are elongated.

17. The device of claim **16**, wherein said top wall of said cage is substantially perpendicular to said front wall of said cage.

18. The device of claim **17**, wherein said cut-out of said cage has a centerline aligned with said centerline of said ball joint housing.

19. The device of claim **11**, wherein said mounting holes of said upper clamping plate are clearance holes and said mounting holes of said lower clamping plate of said ball joint assembly are threaded holes; and said plurality of bolts pass through said clearance holes of said upper clamping plate, through said first and second slot portions of said top wall of said cage, and threaded with said threaded holes of said lower clamping plate of said ball joint assembly.

* * * * *

EXHIBIT B - U.S. PATENT NO. 7,857,332

US007857332B2

(12) **United States Patent**
Hsu

(10) **Patent No.: US 7,857,332 B2**
(45) **Date of Patent: Dec. 28, 2010**

(54) **CAMBER ARM AND BALL JOINT ASSEMBLY**

(75) Inventor: **David Hsu**, Norco, CA (US)

(73) Assignee: **Group-A Autosports, Inc.**, Norco, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 197 days.

(21) Appl. No.: **12/234,287**

(22) Filed: **Sep. 19, 2008**

(65) **Prior Publication Data**

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(51) **Int. Cl.**
B62D 17/00 (2006.01)

(52) **U.S. Cl.** **280/86.757**; 280/86.751

(58) **Field of Classification Search** 280/5.521, 280/86.751, 86.757

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,290,923	A *	7/1942	Wahlberg	280/86.757
2,544,331	A *	3/1951	Kogstrom	280/86.754
2,605,118	A *	7/1952	Booth et al.	280/86.756
2,664,297	A *	12/1953	Booth	280/86.757
2,684,253	A *	7/1954	Leighton	280/86.751
2,900,196	A *	8/1959	Nienke	280/86.756
2,923,555	A *	2/1960	Kost et al.	280/86.756
3,273,909	A *	9/1966	Muller et al.	280/86.756
3,999,779	A *	12/1976	Bishop	280/5.521
4,973,075	A *	11/1990	Rori et al.	280/86.757
5,292,149	A *	3/1994	Luger	280/5.521
5,361,864	A *	11/1994	Tanaka	180/219
5,538,273	A *	7/1996	Osenbaugh et al.	280/86.756
5,697,632	A *	12/1997	Burman et al.	280/86.756
5,951,030	A *	9/1999	Butler	280/86.751
6,224,075	B1 *	5/2001	McIntyre	280/86.751
6,293,724	B1 *	9/2001	Spears et al.	403/122
6,478,318	B1 *	11/2002	Allman et al.	280/86.751
6,485,038	B1 *	11/2002	Garrard	280/86.75
6,557,872	B1 *	5/2003	Garrard	280/86.751
6,932,366	B2 *	8/2005	Jones et al.	280/86.751
7,278,648	B2 *	10/2007	Bobbitt et al.	280/86.751
7,467,800	B2 *	12/2008	Houser et al.	280/5.521
7,513,514	B1 *	4/2009	Schlosser et al.	280/93.511
7,568,711	B2 *	8/2009	Houser et al.	280/86.756
D602,408	S *	10/2009	Hsu	D12/159

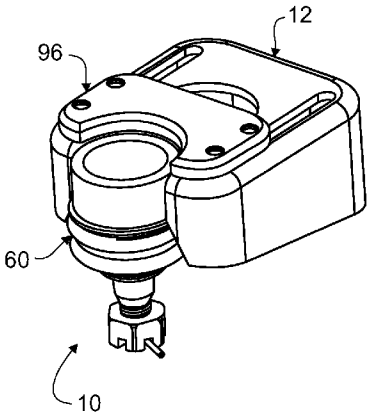
* cited by examiner

Primary Examiner—Paul N Dickson
Assistant Examiner—Laura Freedman
(74) *Attorney, Agent, or Firm*—Steven N. Fox, Esq.

(57) **ABSTRACT**

A device for adjusting camber angle of a vehicle tire/wheel assembly, comprising a camber arm having first and second arms and a cage. The cage comprises a cavity, top and front walls, sidewalls, and a cut-out, the first and second arms connected to the sidewalls. The device further comprises a ball joint assembly adjustably engaged with the cage, and comprising a housing and a lower clamping plate. The device further comprises an upper clamping plate, the upper and lower clamping plates bolted to the cage top wall. The ball joint assembly moveable from a first position where an outward portion of the ball joint housing is disposed outside of the cage cavity, and a second position where the outward portion of the ball joint housing is disposed within the cage cavity.

16 Claims, 15 Drawing Sheets



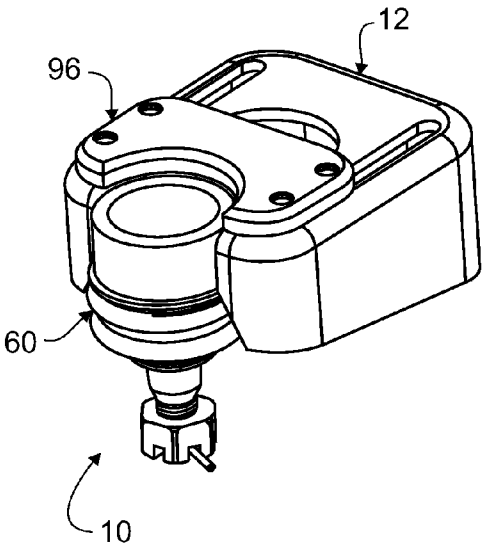


FIG. 1

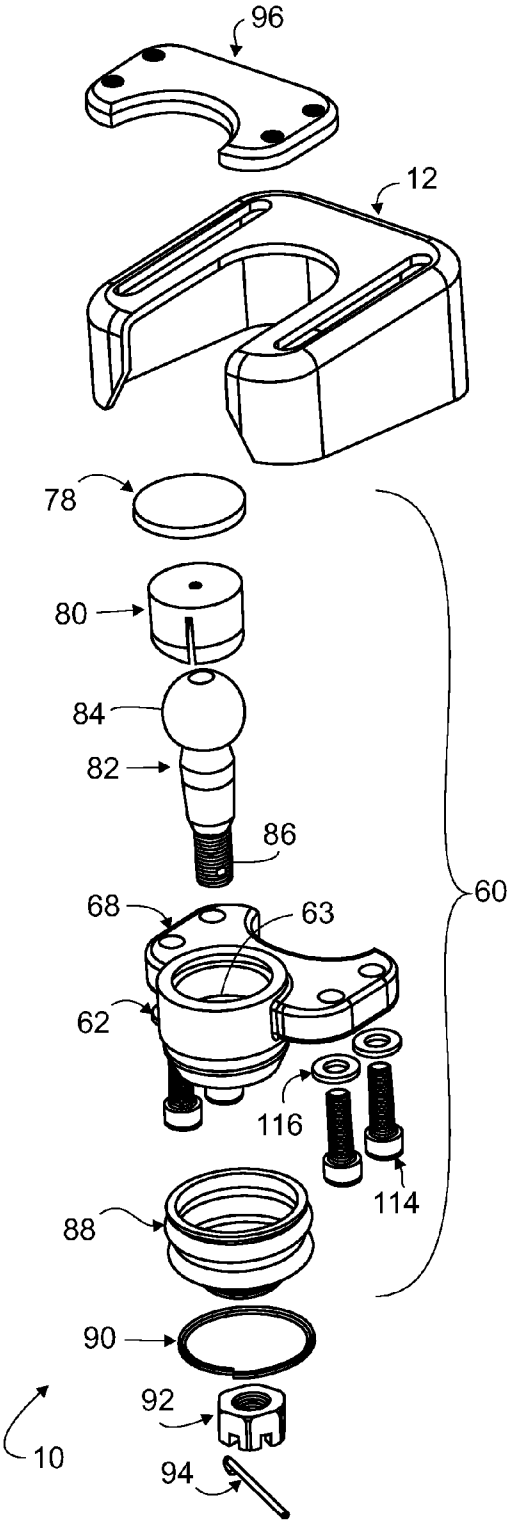


FIG. 2

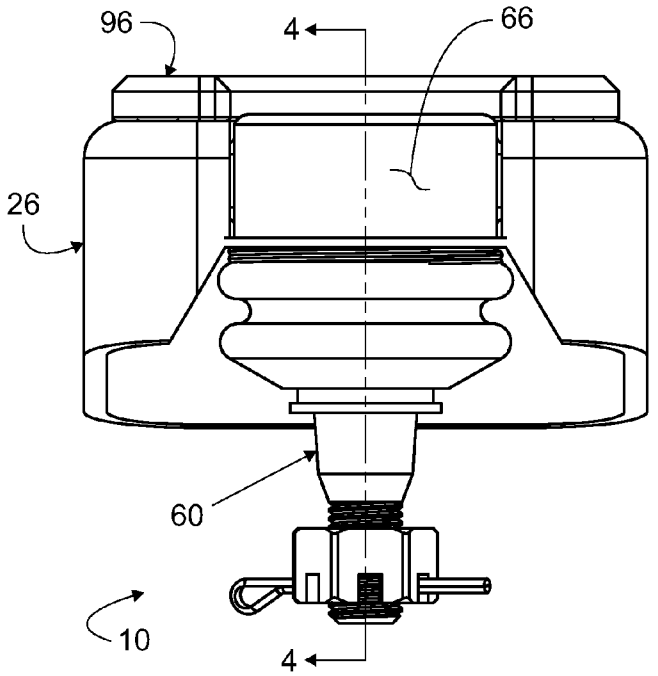


FIG. 3

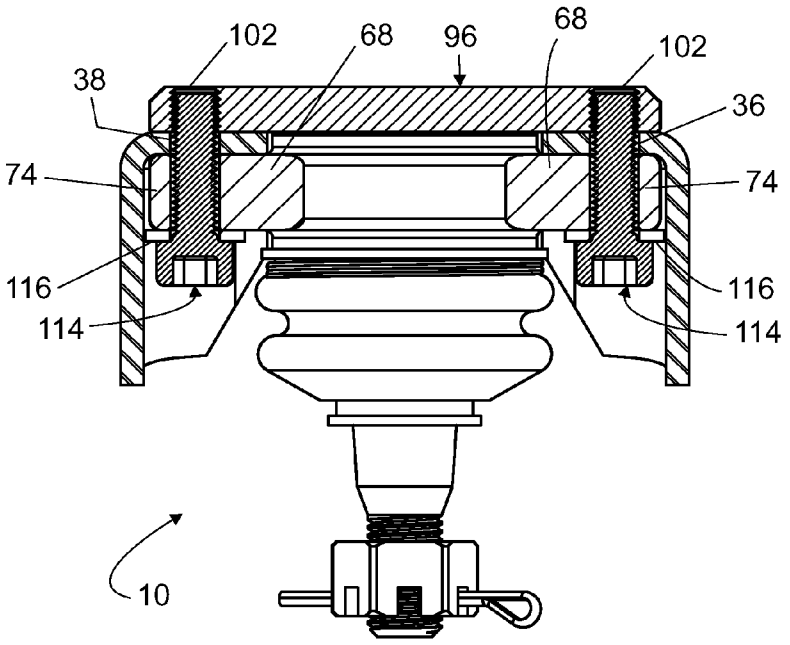


FIG. 5

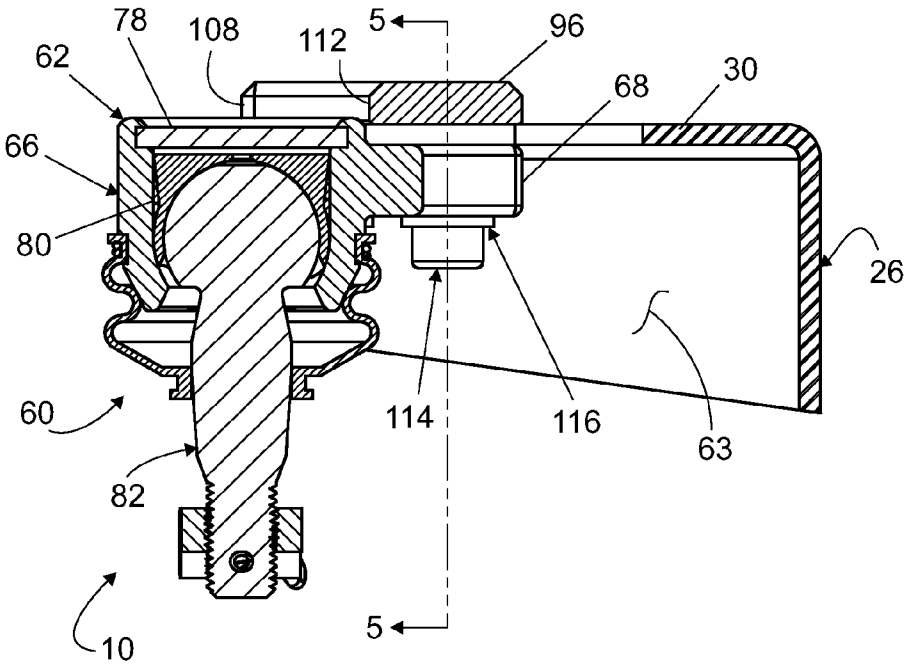


FIG. 4A

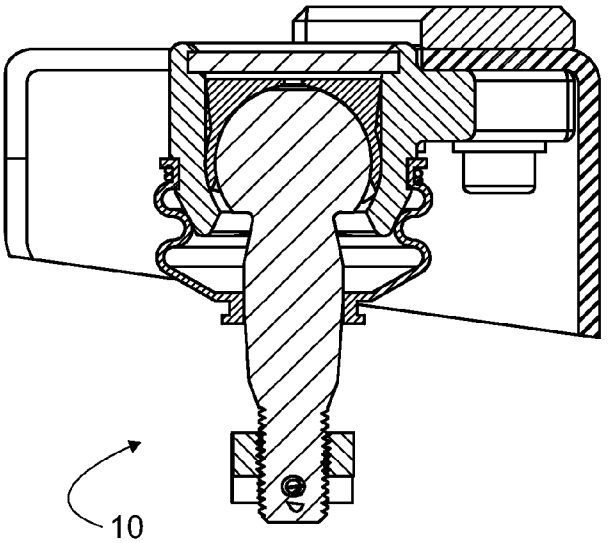


FIG. 4B

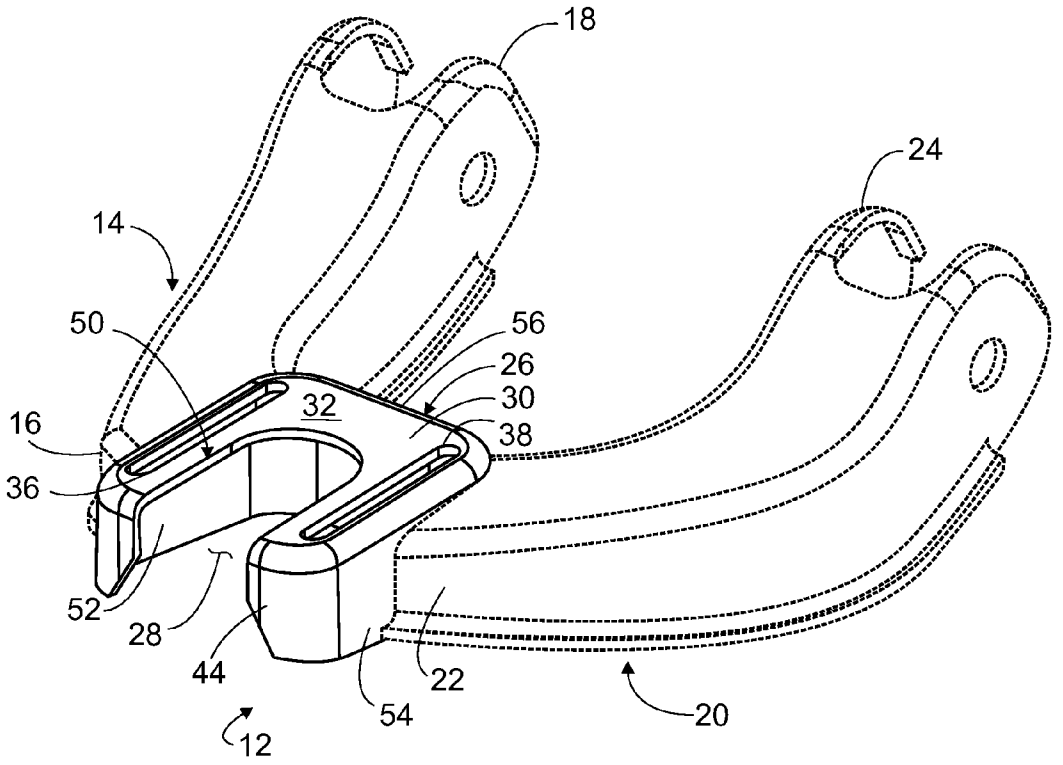


FIG. 6

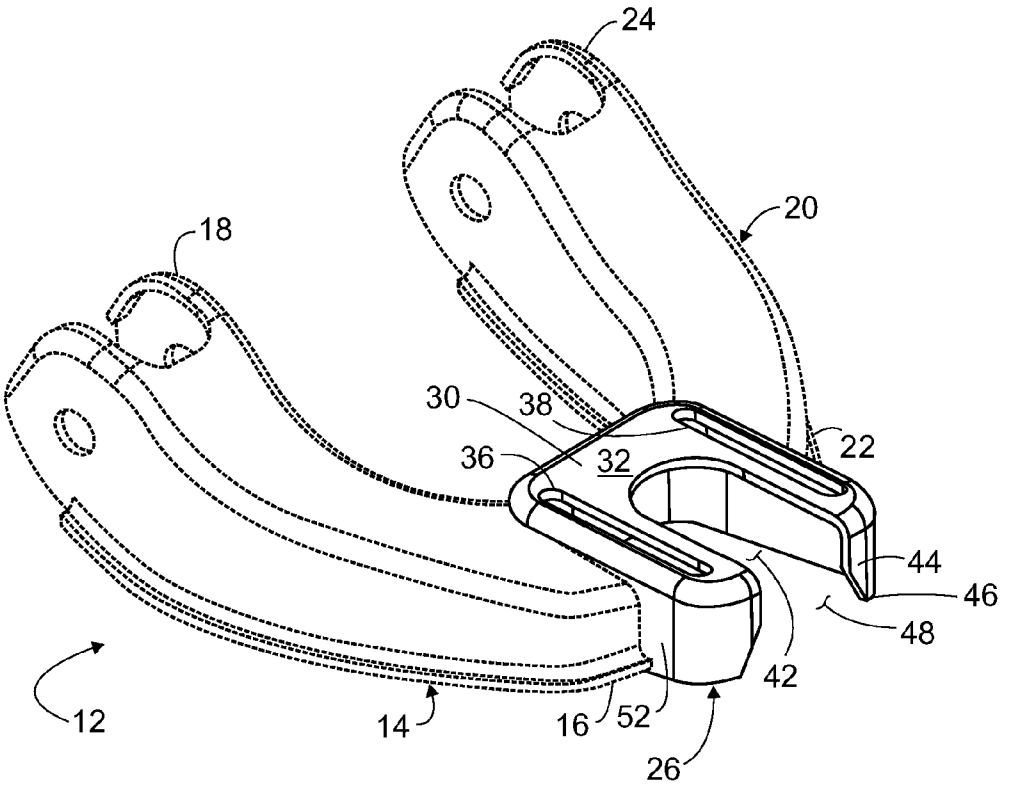


FIG. 7

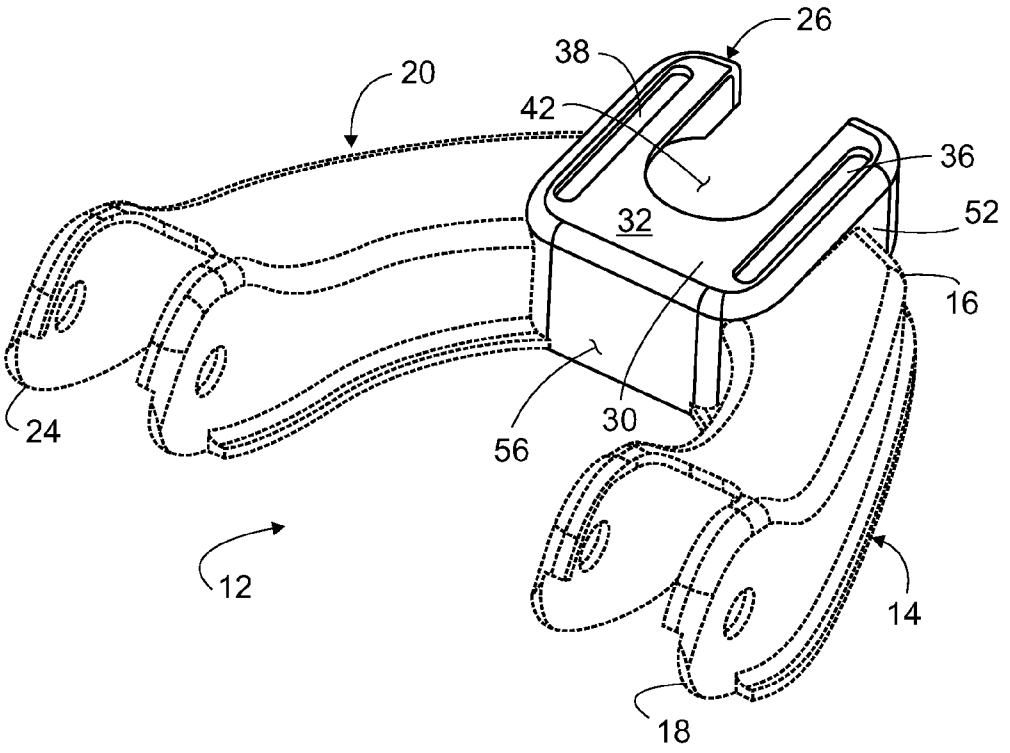


FIG. 8

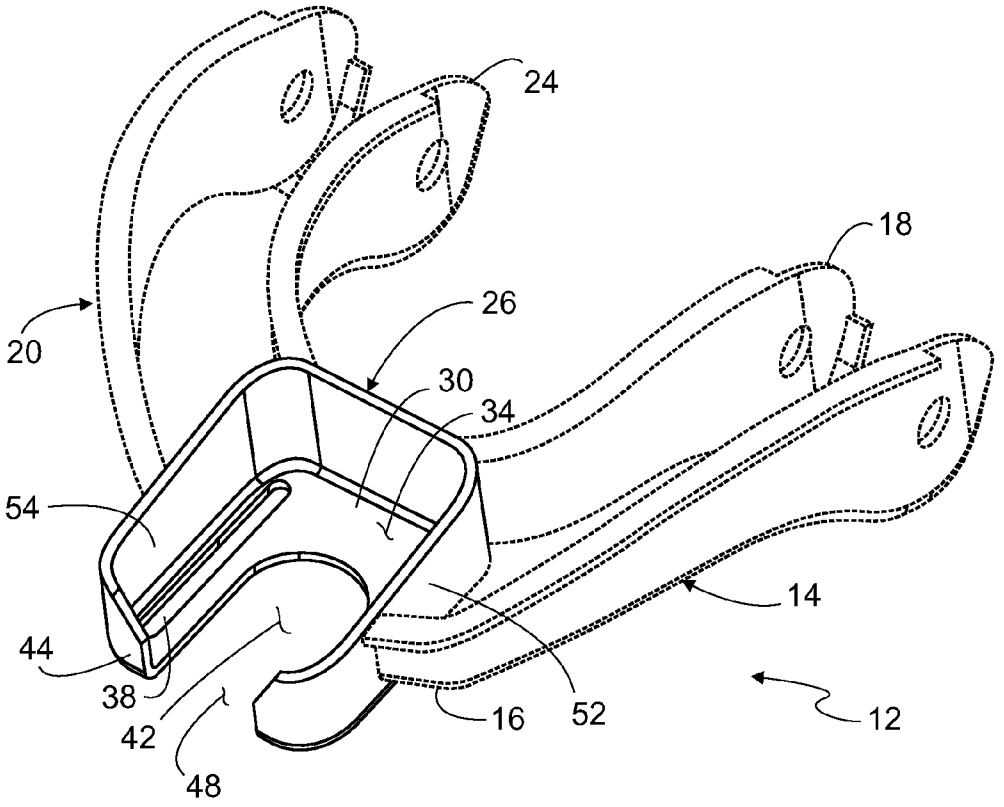


FIG. 9

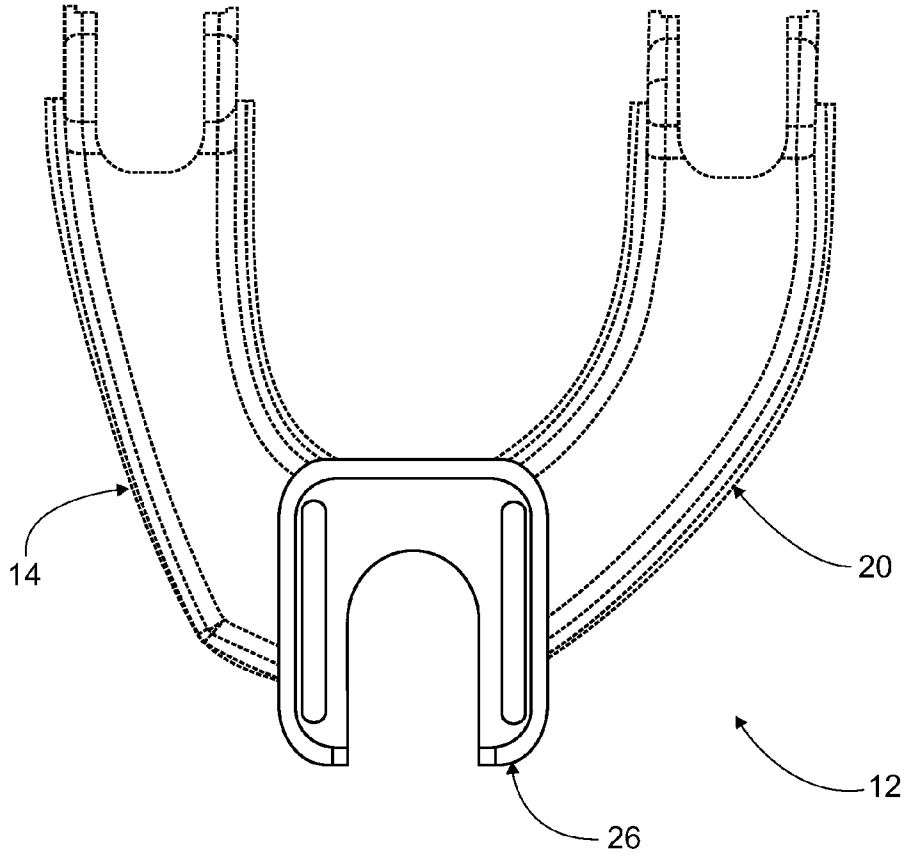


FIG. 10

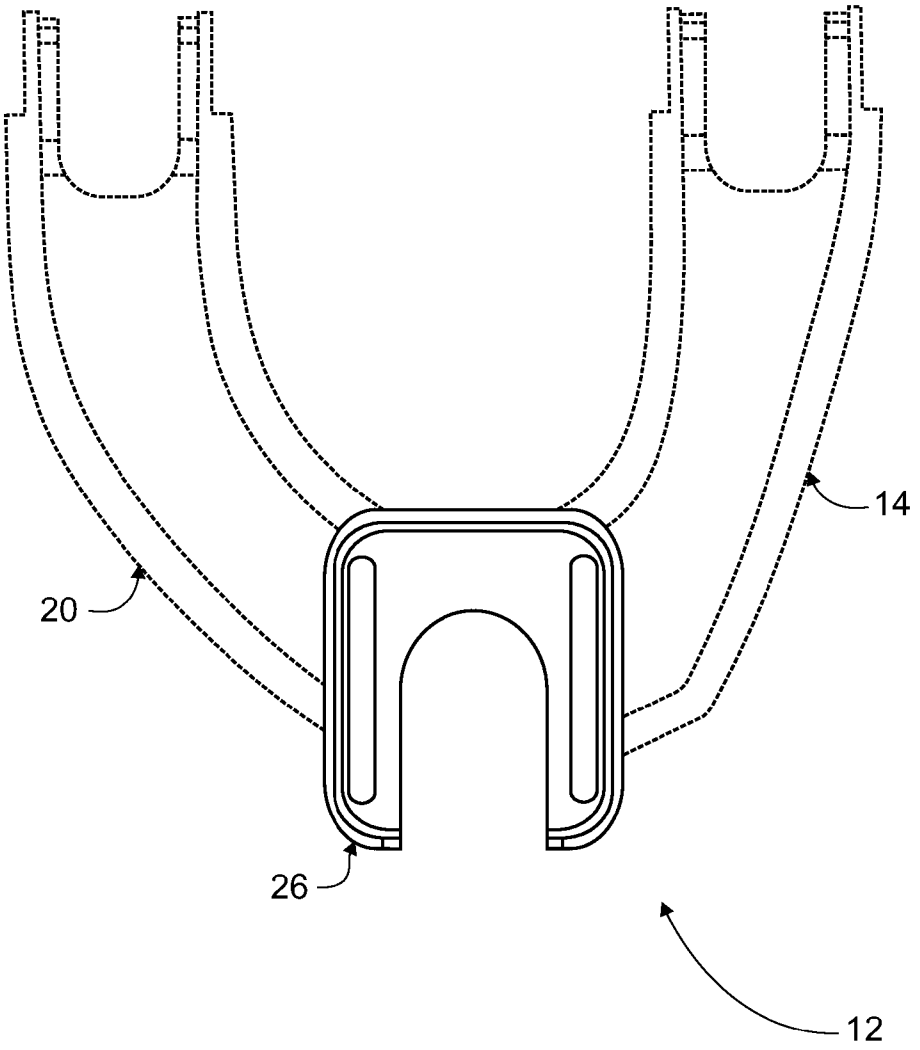


FIG. 11

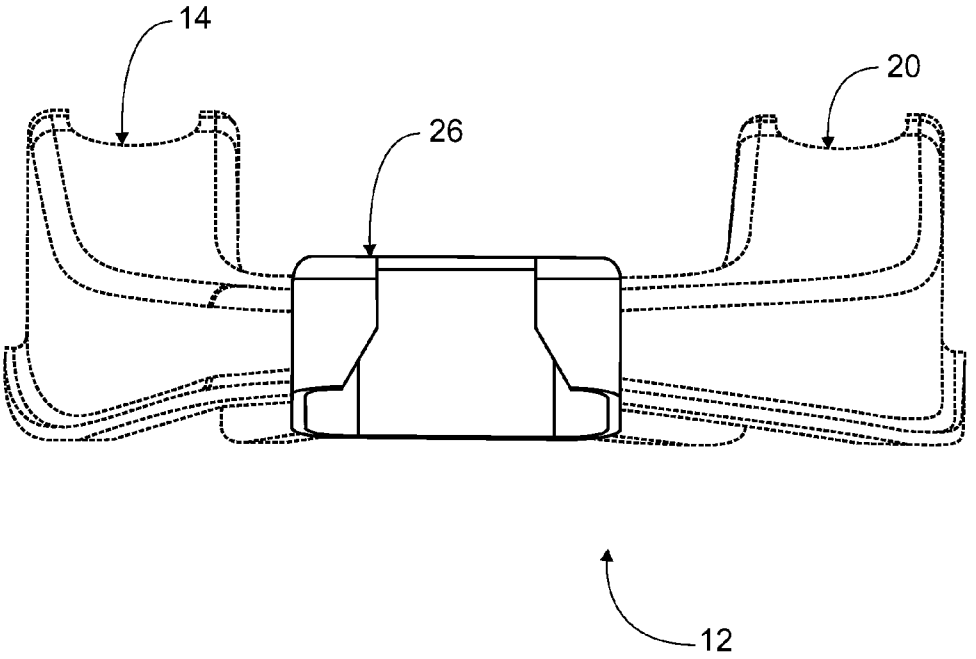


FIG. 12

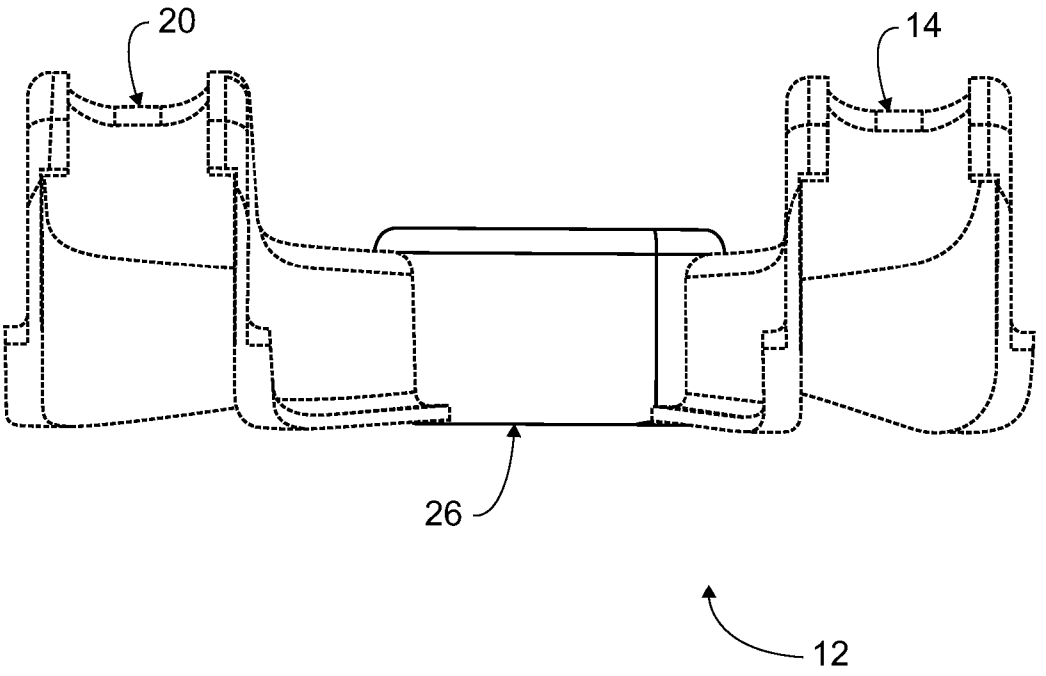


FIG. 13

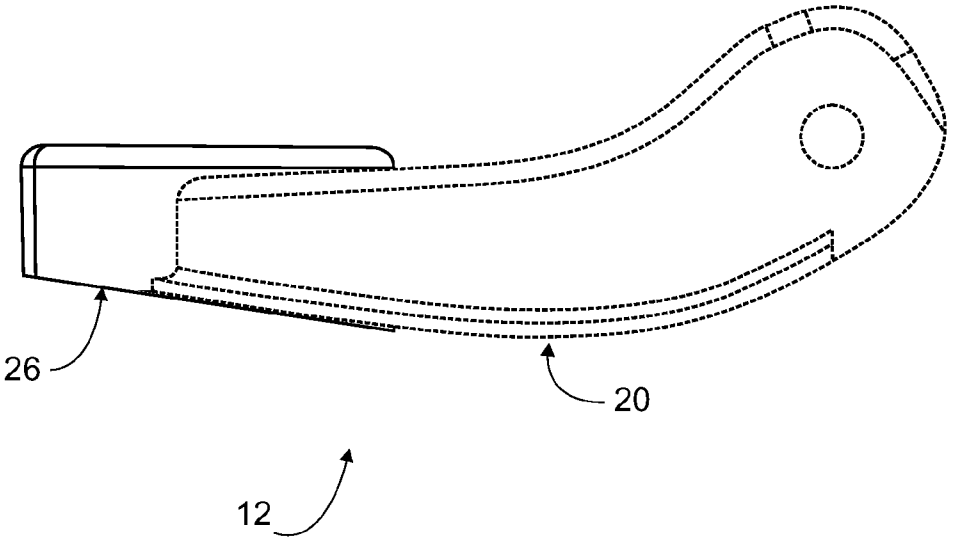


FIG. 14

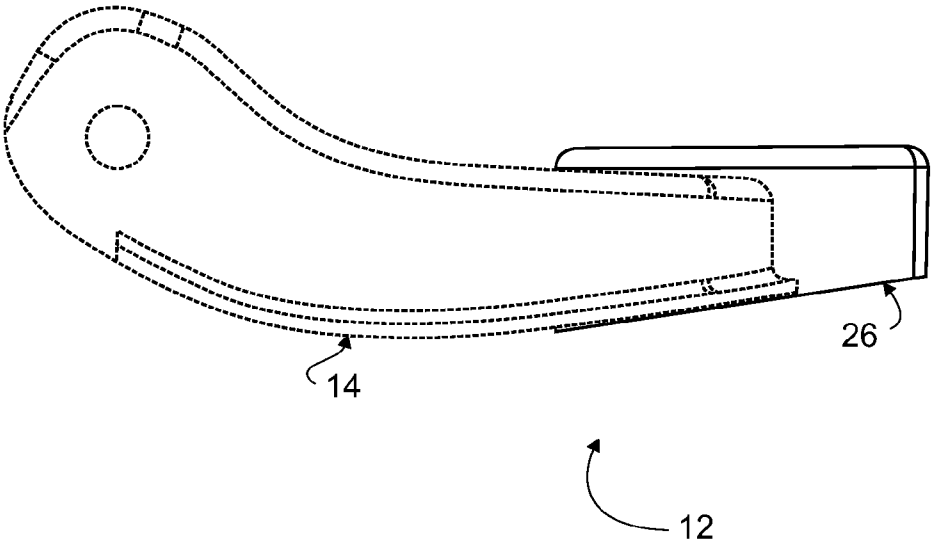


FIG. 15

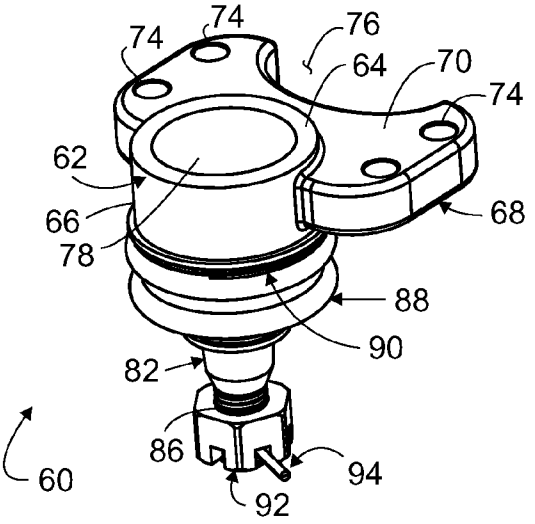

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FIG. 16

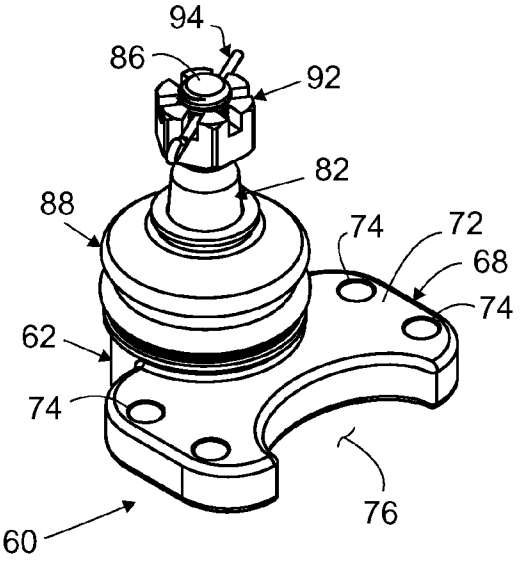
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FIG. 17

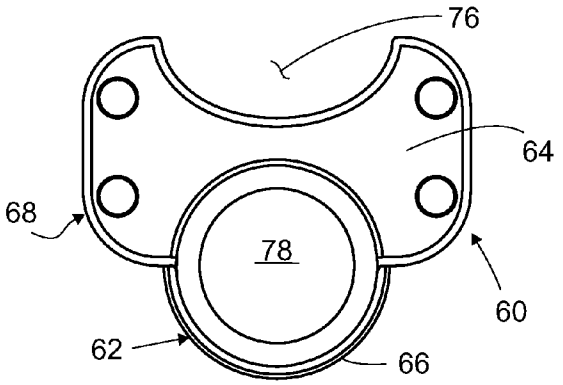


FIG. 18

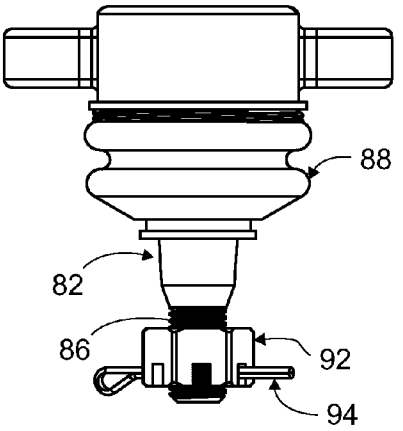


FIG. 19

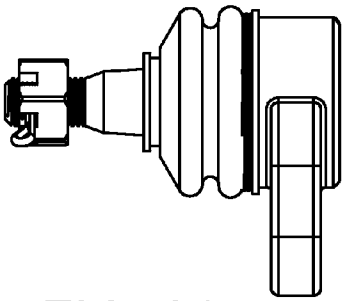


FIG. 21

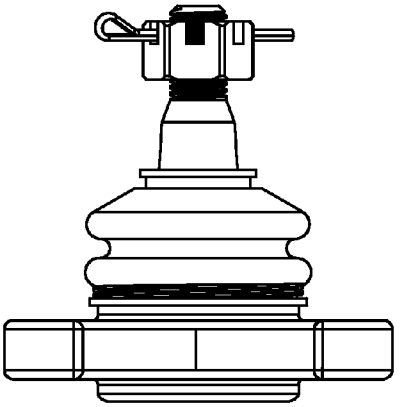


FIG. 20

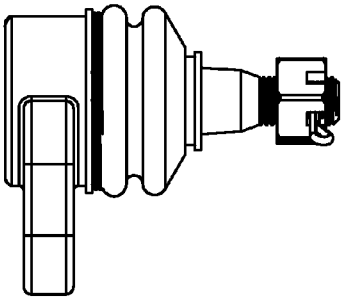


FIG. 22

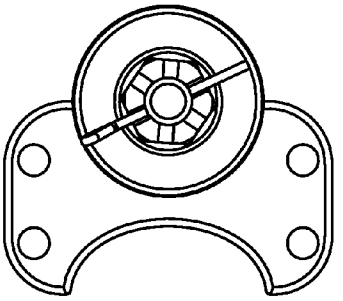


FIG. 23

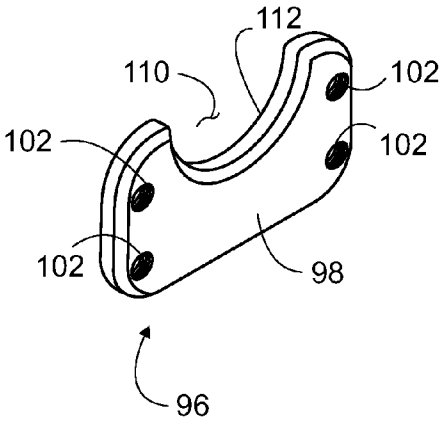


FIG. 24

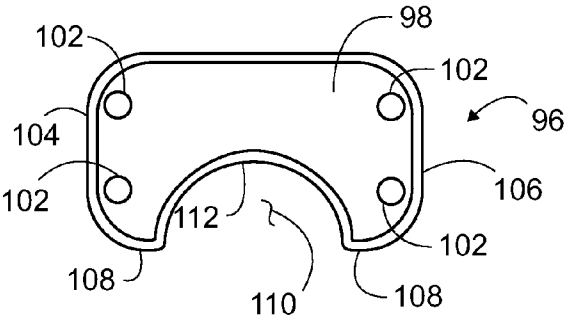


FIG. 25

FIG. 26

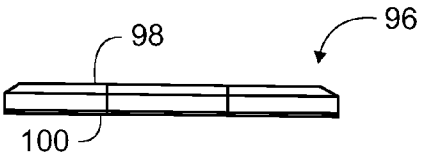


FIG. 27

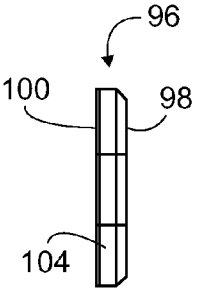


FIG. 28

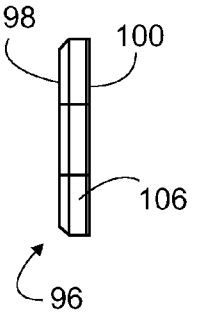


FIG. 29

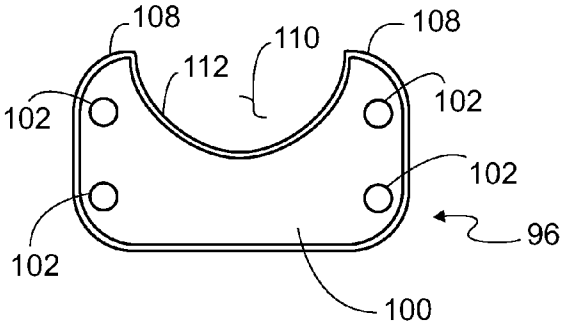


FIG. 30

CAMBER ARM AND BALL JOINT ASSEMBLY

BACKGROUND OF THE INVENTION

A camber arm is used to adjust the camber angle of a tire/wheel assembly of a vehicle. The camber angle is the inward or outward tilt of the tire/wheel assembly and is measured from a true vertical line perpendicular to the ground. A tire/wheel assembly that is tilted outward at the top is considered to have positive camber. In contrast, a tire/wheel assembly tilted inward at the top is considered to have negative camber. For a zero setting, the tire/wheel assembly is in an exact vertical position or perpendicular to the ground. Positive camber results in a dynamic loading that allows the tire to run relatively flat against the road surface. Positive camber directs the weight and shock load of the vehicle on the larger inner wheel bearing and inboard portion of the spindle rather than the outboard bearing. A moderate positive camber results in longer bearing life, less likely sudden load failure, and easier steering. Excessive positive camber wears the outside of the tire and may cause wear to suspension parts such as wheel bearings and spindles. Negative camber can be used to improve the handling of a vehicle. A setting of ½° negative on both sides of a street car will improve cornering without affecting tire life greatly. This negative setting compensates for the slight positive camber change of the outside tire due to vehicle roll, thereby allowing a flatter tire contact patch during cornering. Excessive negative camber wears the inside of the tire and can cause wear and stress on suspension parts. Conventional devices do not allow the camber angle to be adjusted between a satisfactory range of positive and negative camber angles without failure under severe dynamic loads.

SUMMARY OF THE INVENTION

One object of the present invention is to provide a camber arm that allows the camber angle to be adjusted between a wider range of positive and negative camber angles without failure under severe dynamic loads.

The present invention is a device for adjusting the camber angle of a tire/wheel assembly of a vehicle. In one embodiment, the device comprises a camber arm having first and second arms and a cage. The cage comprises a cavity, a top wall, a front wall, and first and second sidewalls. The first and second arms are connected to the first and second sidewalls of the cage. The top wall comprises an outside surface, an inside surface, and first and second slot portions. The cage further comprising a cut-out extending along the front and top walls. The device further comprises a ball joint assembly adjustably engaged with the cage. The ball joint assembly comprises a ball joint housing and a lower clamping plate that is adjustably fastened to the inside surface of the top wall. The ball joint housing has an outward portion and an inward portion. The device further comprises an upper clamping plate having an outside surface, an inside surface, a plurality of mounting holes, a front edge portion, first and second side edge portions, and a cut-out having an inner edge portion. The cut-out extends inward from the front edge portion to the inner edge portion to allow access to the ball joint housing when assembled. The device further comprises a plurality of bolts for fastening the upper clamping plate and the lower clamping plate of the ball joint assembly to the top wall of the cage. The ball joint assembly may be adjustably moved from a first position where the outward portion of the ball joint housing is disposed outside of the cavity of the cage and a second position where the outward portion of the ball joint housing is disposed within the cavity of the cage.

BRIEF DESCRIPTION OF THE DRAWINGS

The following detailed description of the invention will more fully understood with reference to the accompanying drawings wherein:

FIG. **1** is a perspective view of the camber arm assembly according to the present invention shown without left and right camber arms;

FIG. **2** is an exploded view of the camber arm assembly without left and right camber arms;

FIG. **3** is a front elevation view of the camber arm assembly without left and right camber arms;

FIG. **4**A is a cross-section view taken along line **4**-**4** of FIG. **3** without left and right camber arms and showing the outward portion of the ball joint housing disposed outward of the cavity of the cage;

FIG. **4**B is a cross-section view taken along line **4**-**4** of FIG. **3** without left and right camber arms and showing the outward portion of the ball joint housing disposed within the cavity of the cage;

FIG. **5** is a cross-section view taken along line **5**-**5** of FIG. **5** without left and right camber arms;

FIGS. **6** and **7** are top front perspective views of the camber arm according to the present invention;

FIG. **8** is a top rear perspective view of the camber arm;

FIG. **9** is a bottom front perspective view of the camber arm;

FIG. **10** is a top plan view of the camber arm;

FIG. **11** is a bottom plan view of the camber arm;

FIG. **12** is a front elevation view of the camber arm;

FIG. **13** is a rear elevation view of the camber arm;

FIG. **14** is a left side elevation view of the camber arm;

FIG. **15** is a right side elevation view of the camber arm;

FIG. **16** is a top perspective view of the ball joint assembly according to the present invention;

FIG. **17** is a bottom perspective view of the ball joint assembly;

FIG. **18** is a top plan view of the ball joint assembly;

FIG. **19** is a front elevation view of the ball joint assembly;

FIG. **20** is a rear elevation view of the ball joint assembly;

FIG. **21** is a left side elevation view of the ball joint assembly;

FIG. **22** is a right side elevation view of the ball joint assembly;

FIG. **23** is a bottom plan view of the ball joint assembly;

FIG. **24** is a top perspective view of the upper clamping plate according to the present invention;

FIG. **25** is a top plan view of the upper clamping plate;

FIG. **26** is a front elevation view of the upper clamping plate;

FIG. **27** is a rear elevation view of the upper clamping plate;

FIG. **28** is a left side elevation view of the upper clamping plate;

FIG. **29** is a right side elevation view of the upper clamping plate; and

FIG. **30** is a bottom plan view of the upper clamping plate.

DESCRIPTION OF THE INVENTION

Referring to FIGS. **1**-**2**, the present invention is a device **10** for adjusting the camber angle of a tire/wheel assembly (not shown) of a vehicle. In one embodiment, device **10** generally comprises a camber arm assembly **12**, a ball joint assembly **60**, and an upper clamping plate **96**. For ease of illustration, left and right arms **14** and **20** (to be described) are not shown. Ball joint assembly **60** may be adjustably positioned on cam-

ber arm assembly **12** and secured thereto by upper clamping plate **96** and bolts **114** and washers **116**.

Referring to FIGS. **6-15**, camber arm assembly **12** generally comprises left and right arms **14** and **20**, and a central cage **26**. Left arm **14** generally comprises a first end portion **16** and a second end portion **18**. Right arm **20** generally comprises a first end portion **22** and a second end portion **24**. Cage **26** generally comprises a cavity **28**, a top wall **30**, a front wall **44**, first and second sidewalls **52** and **54**, and a rear wall **56**. Cage **26** further comprises a large cut-out **50** formed by a cut-out **42** (to be described) along top wall **30** and a cut-out **48** (to be described) along front wall **44**. Second end portions **18** and **24** of first and second arms **14** and **20** are adapted for connection to the chassis frame (not shown) of the vehicle. In the embodiment shown, first end portions **16** and **22** of first and second arms **14** and **20** are secured to left and right sidewalls **52** and **54** (to be described) of cage **26**, respectively, by conventional means such as welding. Arms **14** and **20** may be of any desired shape and configuration based upon the chassis frame or other vehicle specifications. Top wall **30** of cage **26** comprises an outside surface **32**, an inside surface **34**, and first and second slots **36** and **38**; and a cut-out **42**. First and second slots **36** and **38** receive bolts **114** so that upper clamping plate **96** and lower clamping plate **68** of ball joint assembly **60** may be adjustably secured to and along top wall **30** of cage **26** by sliding the assembly within slots **36** and **38**. Front wall **44** comprises a bottom edge **46** and a cut-out **48**. Arms **14** and **20**, and cage **26** are made from steel and fabricated by conventional stamping and machining operations.

Referring to FIGS. **2** and **16-23**, ball joint assembly **60** comprises a ball joint housing **62** having a cavity **63**, an inward portion **64**, and an outward portion **66**. Ball joint assembly **60** further comprises a lower clamping plate **68** extending outward from inward portion **64**. Lower clamping plate **68** comprises an upper surface **70**, a lower surface **72**, mounting holes **74**, and a cut-out **76**. In the embodiment shown, mounting holes **74** are clearance holes to receive bolts **114** which are then threaded into mounting holes **102** (to be described) of upper clamping plate **96**. In other embodiments, mounting holes **74** may be threaded holes and mounting holes **102** (to be described) of upper clamping plate **96** may be clearance holes wherein bolts **114** would be inserted into clearance holes **102** (to be described) and then threaded into mounting holes **74**. Housing **62** and lower clamping plate **68** are made from steel and fabricated as a single cast piece by conventional casting and machining operations. Ball joint assembly **60** further comprises a ball joint **82** having a ball portion **84** and a threaded end portion **84**. Ball joint assembly **60** further comprises a plastic sleeve **80** and a housing cover **78**. Sleeve **80** is disposed about ball portion **84** of ball joint **82** and inserted within cavity **63** of ball joint housing **62** such that threaded end portion **84** extends downward out of cavity **63**. Cover **78** is removably engaged with ball joint housing **62** by a force-fit to enclose cavity **63**. Ball joint **82**, sleeve **80**, and housing cover **78** are well known in the industry and widely available. Ball joint assembly **60** further comprises a rubber dust boot **88** to prevent dust or other contamination from entering cavity **63** of ball joint housing **62**. Dust boot **88** is well known in the industry and widely available. Ball joint assembly **60** further comprises a locking ring **90** to retain dust boot **88** about ball joint housing **62**. Locking ring **90** is well known in the industry and widely available. Ball joint assembly **60** further comprises a castle nut **92** and a locking pin **94** to prevent the spindle or steering knuckle (not shown) from being disengaged from ball joint **82**. Nut **92** and locking pin **94** are well known in the industry and widely available.

Referring to FIGS. **24-30**, upper clamping plate **96** comprises an upper surface **98**, a lower surface **100**, and a plurality of threaded mounting holes **102** extending from upper surface **98** to lower surface **100**. Upper clamping plate **96** further comprises side edges portions **104** and **106**, a front edge portion **108**, and a cut-out **110** having an inner edge portion **112**. Cut-out **110** extends inward from front edge portion **108** to inner edge portion **112** to allow access to cover **78** of ball joint housing **62** when assembled. Upon assembly of upper clamping plate **96** to lower clamping plate **68** of ball joint assembly **60**, inner edge portion **112** is substantially aligned and/or immediately adjacent or juxtaposed to inward portion of **64** of ball joint housing **62** thereby allowing a person access to cover **78** and cavity **63** to repair or replace ball joint **82** and/or sleeve **80**. Upper clamping plate **96** is made from steel and fabricated by conventional machining operations.

Referring to FIGS. **3-5**, bolts **114** and washers **116** securely fasten upper clamping plate **96** and lower clamping plate **68** of ball joint assembly **60** to top wall **30** of cage **26**. In the embodiment shown, lower surface **100** of upper clamping plate **96** is engaged with outside surface **32** of top wall **30** of cage **26**, and upper surface **70** of lowering clamping plate **68** of ball joint assembly **60** is engaged with inside surface **34** of top wall **30** of cage **26**. Alternatively, lower surface **72** of lowering clamping plate **68** of ball joint assembly **60** may be engaged with outside surface **32** of top wall **30** of cage **26**, and upper surface **98** of upper clamping plate **96** may be engaged with inside surface **34** of top wall **30** of cage **26**. In either fastening configuration, ball joint assembly **60** may be adjustably moved anywhere between a first position where outward portion **66** of ball joint housing **62** is disposed outside of cavity **63** (FIG. **4**A) and a second position where outward portion **66** of ball joint housing **62** is disposed within cavity **63** (FIG. **4**B). As described heretofore, mounting holes **74** of lower clamping plate **68** are clearance holes to receive or allow passage of bolts **114** which are then inserted thru slots **36** and **38** of cage **26**, and then threaded into threaded mounting holes **102** of upper clamping plate **96**. In other embodiments, mounting holes **74** may be threaded holes and mounting holes **102** of upper clamping plate **96** may be clearance holes wherein bolts **114** would be inserted into clearance holes **102** and then threaded into mounting holes **74**.

The foregoing description is intended for purposes of illustration. The invention may be embodied in other forms or carried out in other ways without departing from the spirit or scope of the invention.

What is claimed:

1. A device for adjusting the camber angle of a tire/wheel assembly of a vehicle comprising:

a camber arm comprising first and second arms and a cage; said cage comprising a cavity, a top wall, a front wall, and first and second sidewalls; said first and second arms being connected to said first and second sidewalls of said cage, respectively; said top wall comprising an outside surface, an inside surface, and first and second slot portions; said cage further comprising a cut-out extending along said front and top walls;

a ball joint assembly adjustably engaged with said cage; said ball joint assembly comprising a ball joint housing and a lower clamping plate; said ball joint housing having an outward portion and an inward portion; said lower clamping plate comprising an upper surface, a lower surface, and a plurality of mounting holes;

an upper clamping plate;

a plurality of bolts for fastening said upper clamping plate and said lower clamping plate of said ball joint assembly to said top wall of said cage; and

whereby said ball joint assembly may be adjustably moved from a first position where said outward portion of said ball joint housing is disposed outside of said cavity to a second position where said outward portion of said ball joint housing is disposed within said cavity.

2. The device of claim **1**, wherein said upper clamping plate comprises an upper surface, a lower surface, a plurality of mounting holes, a front edge portion, and a cut-out having an inner edge portion; said cut-out extending inward from said front edge portion to said inner edge portion to allow access to said ball joint housing when assembled.

3. The device of claim **2**, wherein said lower surface of said upper clamping plate is engaged with said outside surface of said upper wall of said cage; and said upper surface of said lowering clamping plate of said ball joint assembly is engaged with said inside surface of said top wall of said cage.

4. The device of claim **2**, wherein said lower surface of said lowering clamping plate of said ball joint assembly is engaged with said outside surface of said top wall of said cage; and said upper surface of said upper clamping plate of said ball joint assembly is engaged with said inside surface of said upper wall of said cage.

5. The device of claim **3**, wherein said cut-out of said cage is centrally disposed along said front and top walls of said cage.

6. The device of claim **5**, wherein said cut-out of said cage extends the full length of said front wall of said cage.

7. The device of claim **6**, wherein said upper clamping plate further comprises first and second side edges; and said cut-out of said upper clamping plate being centrally disposed between said first and second side edges.

8. The device of claim **7**, wherein said cut-out of said upper clamping plate extends inwardly a distance at least one-half the length of said upper clamping plate.

9. The device of claim **8**, wherein said mounting holes of said upper clamping plate are threaded holes and said mounting holes of said lower clamping plate of said ball joint assembly are clearance holes; and said plurality of bolts pass through said clearance holes of said lower clamping plate of said ball joint assembly, through said first and second slot portions of said top wall of said cage, and threaded with said threaded holes of said upper clamping plate.

10. The device of claim **8**, wherein said mounting holes of said upper clamping plate are clearance holes and said mounting holes of said lower clamping plate of said ball joint assembly are threaded holes; and said plurality of bolts pass through said clearance holes of said upper clamping plate, through said first and second slot portions of said top wall of said cage, and threaded with said threaded holes of said lower clamping plate of said ball joint assembly.

11. The device of claim **10**, wherein said cut-out of said upper clamping plate is substantially the same shape as said inward portion of said ball joint housing.

12. The device of claim **11**, wherein said cut-out of said upper clamping plate is concave shaped.

13. The device of claim **12**, wherein said inward portion of said ball joint housing is convex shaped.

14. The device of claim **13**, wherein said first and second slots are elongated.

15. The device of claim **14**, wherein said top wall of said cage is substantially perpendicular to said front wall of said cage.

16. The device of claim **15**, wherein said cut-out of said cage has a centerline aligned with said centerline of said ball joint housing.

* * * * *

EXHIBIT C - U.S. PATENT NO. D602408

US00D602408S

(12) **United States Design Patent**
Hsu

(10) **Patent No.:** **US D602,408 S**
(45) **Date of Patent:** ** **Oct. 20, 2009**

(54) **PORTION OF A CAMBER ARM**

(76) Inventor: **David Hsu**, 2050 5th St., Norco, CA (US) 92860

(**) Term: **14 Years**

(21) Appl. No.: **29/323,436**

(22) Filed: **Aug. 26, 2008**

(51) **LOC (9) Cl.** **12-16**
(52) **U.S. Cl.** **D12/159**
(58) **Field of Classification Search** D12/400, D12/340, 161, 159, 120, 118, 114; 280/11.225, 280/86.752; 188/315, 316, 298, 274, 281, 188/286, 297; 293/134; 267/195; 279/2.01, 279/2.17
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,530,514	A *	7/1985	Ito	280/124.13
2004/0021286	A1 *	2/2004	Bombardier et al.	280/124.134
2004/0094927	A1 *	5/2004	Nagreski et al.	280/93.512
2005/0127634	A1 *	6/2005	Gerrard	280/124.143
2005/0212244	A1 *	9/2005	Bobbitt et al.	280/86.751
2009/0066051	A1 *	3/2009	Gerrard	280/124.134

* cited by examiner

Primary Examiner—T. Chase Nelson
Assistant Examiner—Michael A Pratt

(57) **CLAIM**

The ornamental design for a portion of a camber arm, as shown and described.

DESCRIPTION

FIG. **1** is a top front perspective view of the design according to the present invention;

FIG. **2** is another top front perspective view of the design according to the present invention;

FIG. **3** is a top rear perspective view of the design according to the present invention;

FIG. **4** is a bottom front perspective view of the design according to the present invention;

FIG. **5** is a top plan view of the design according to the present invention;

FIG. **6** is a bottom plan view of the design according to the present invention;

FIG. **7** is a front elevation view of the design according to the present invention;

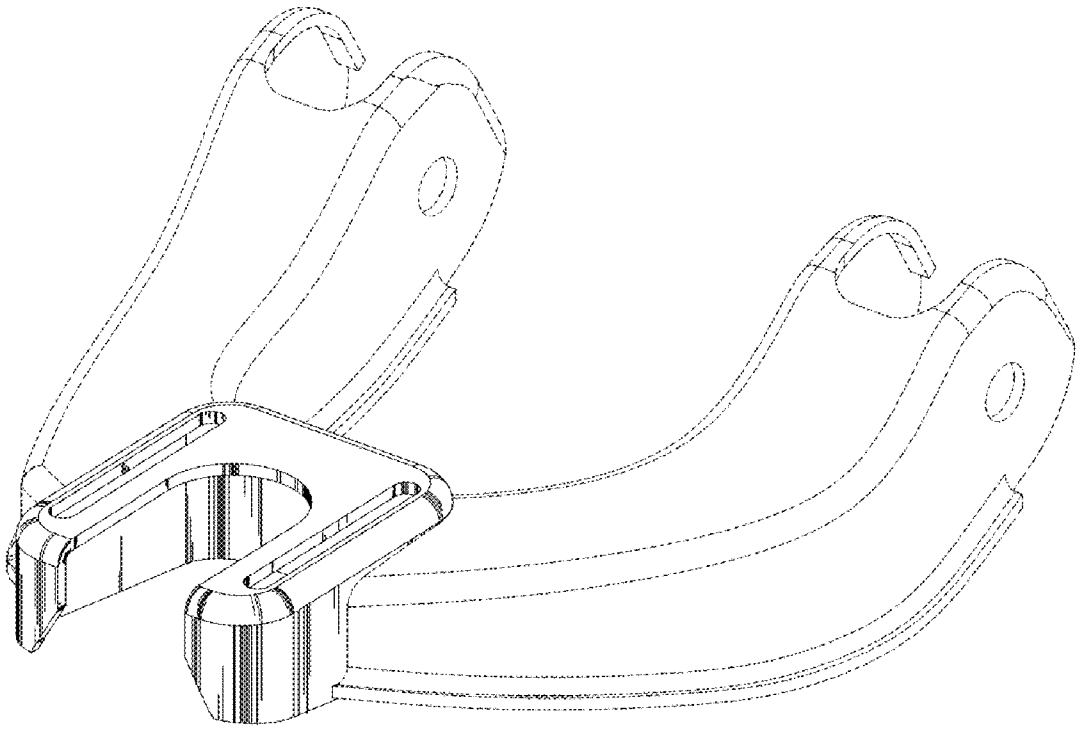
FIG. **8** is a rear elevation view of the design according to the present invention;

FIG. **9** is a left side elevation view of the design according to the present invention; and,

FIG. **10** is a right side elevation view of the design according to the present invention.

The broken lines in the drawings are environmental and form no part of the claimed design.

1 Claim, 10 Drawing Sheets



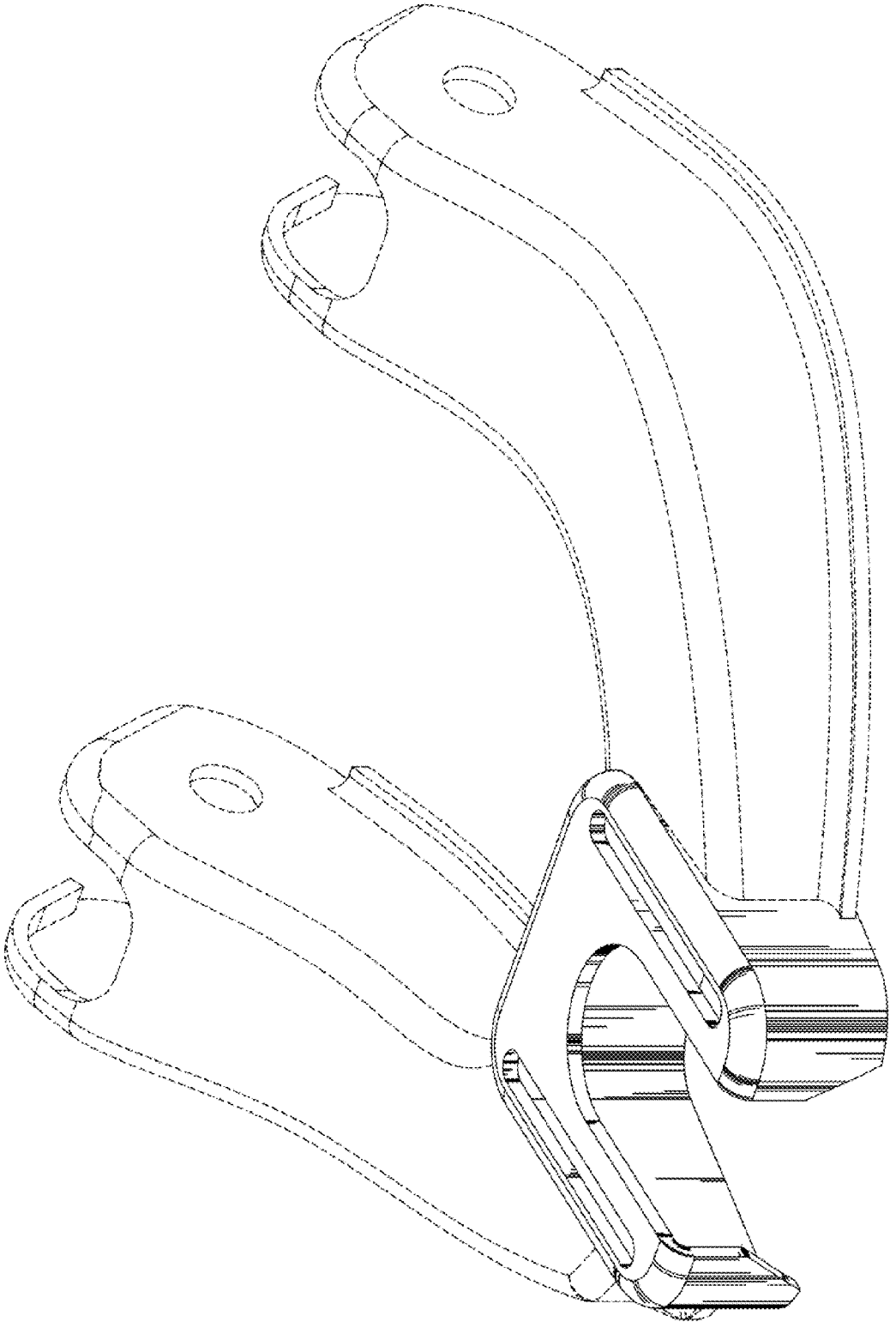


FIG. 1

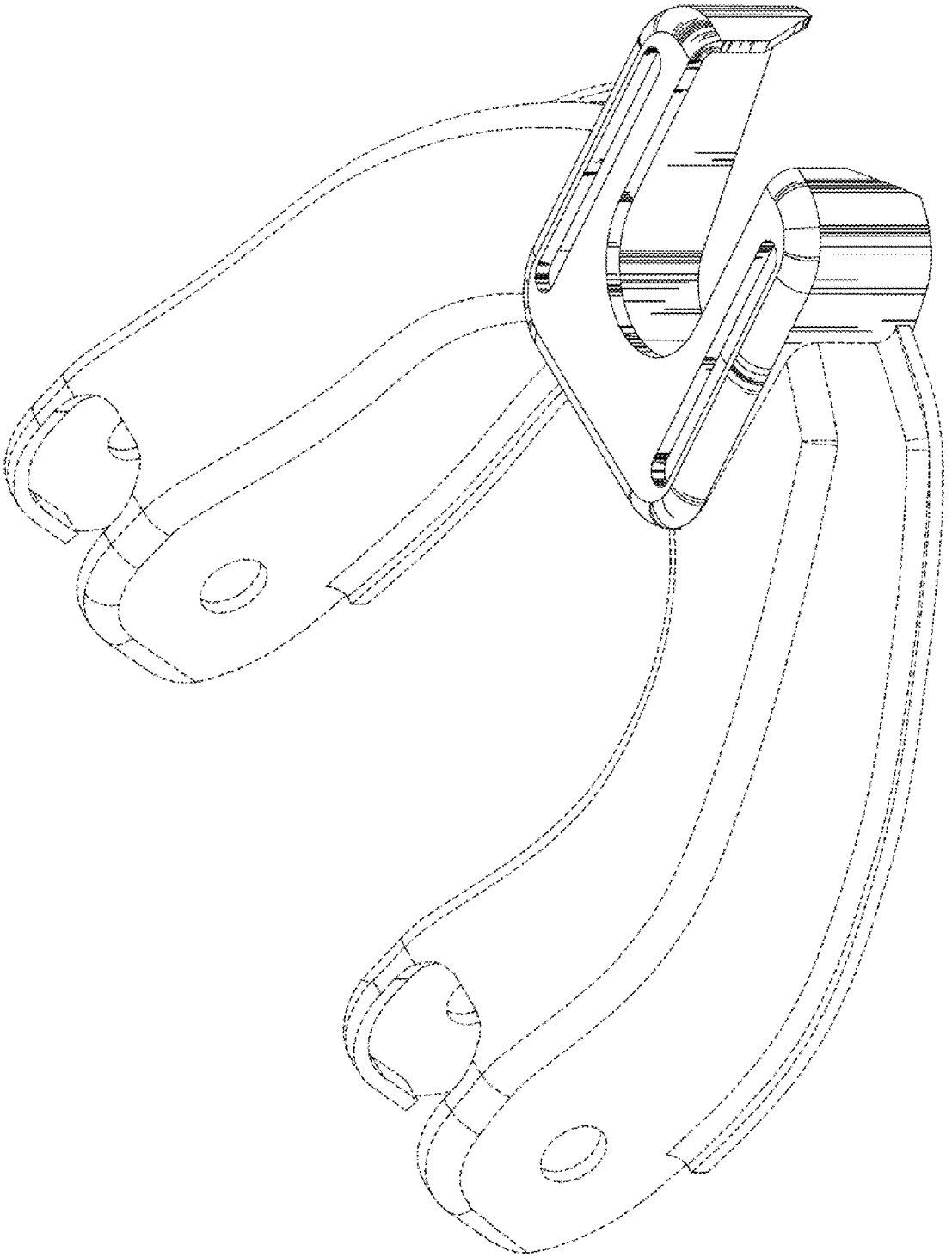


FIG. 2

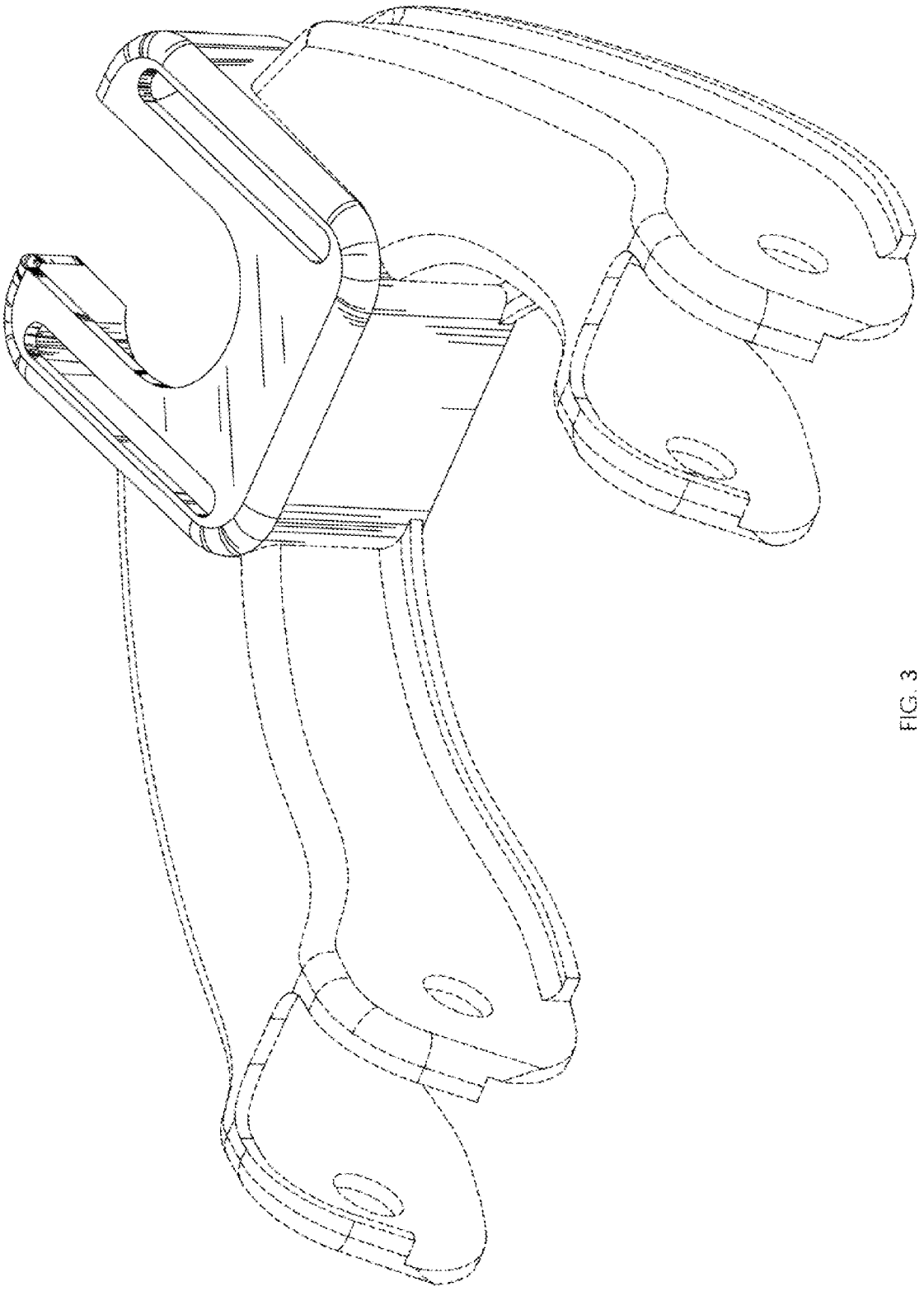


FIG. 3

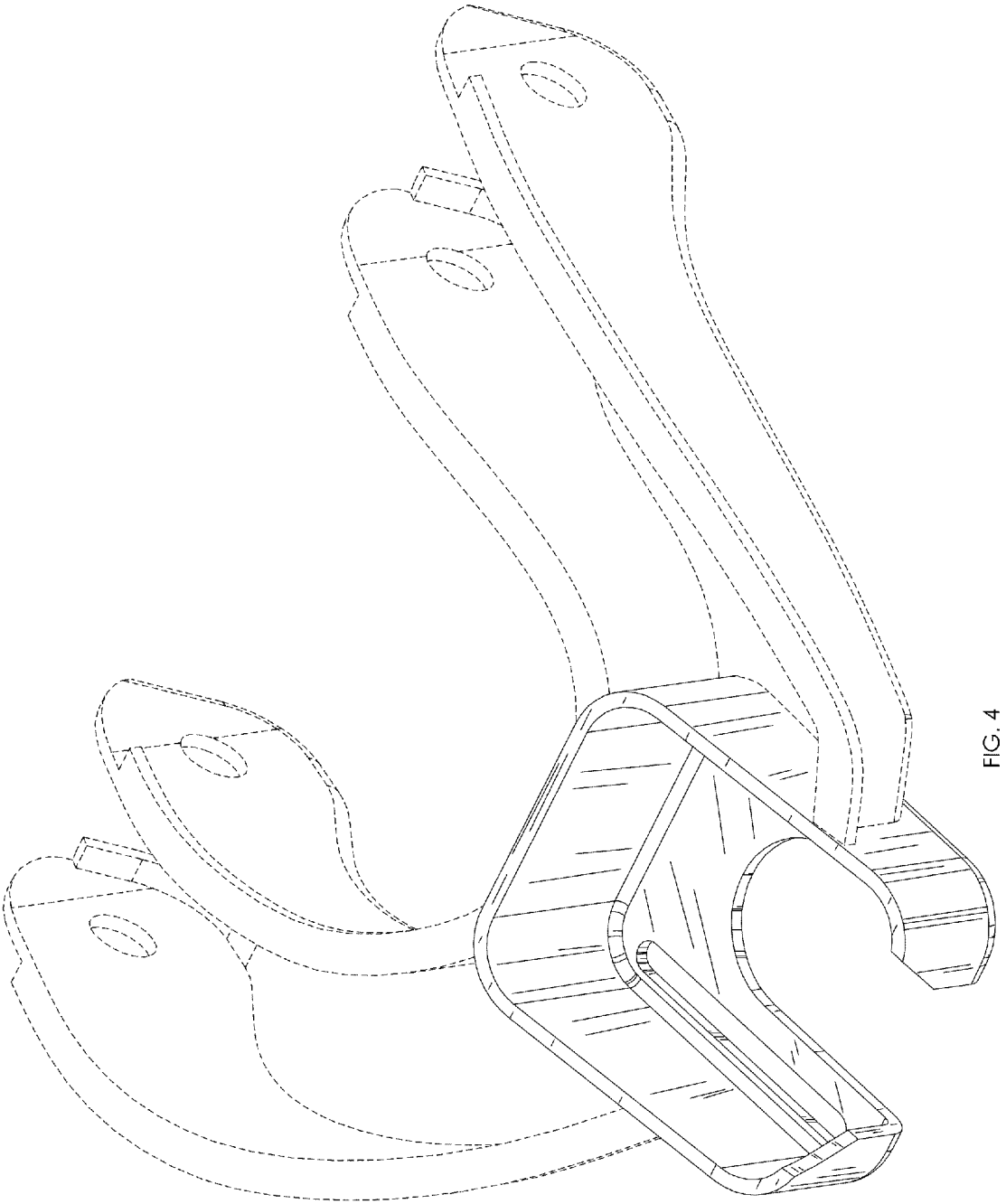


FIG. 4

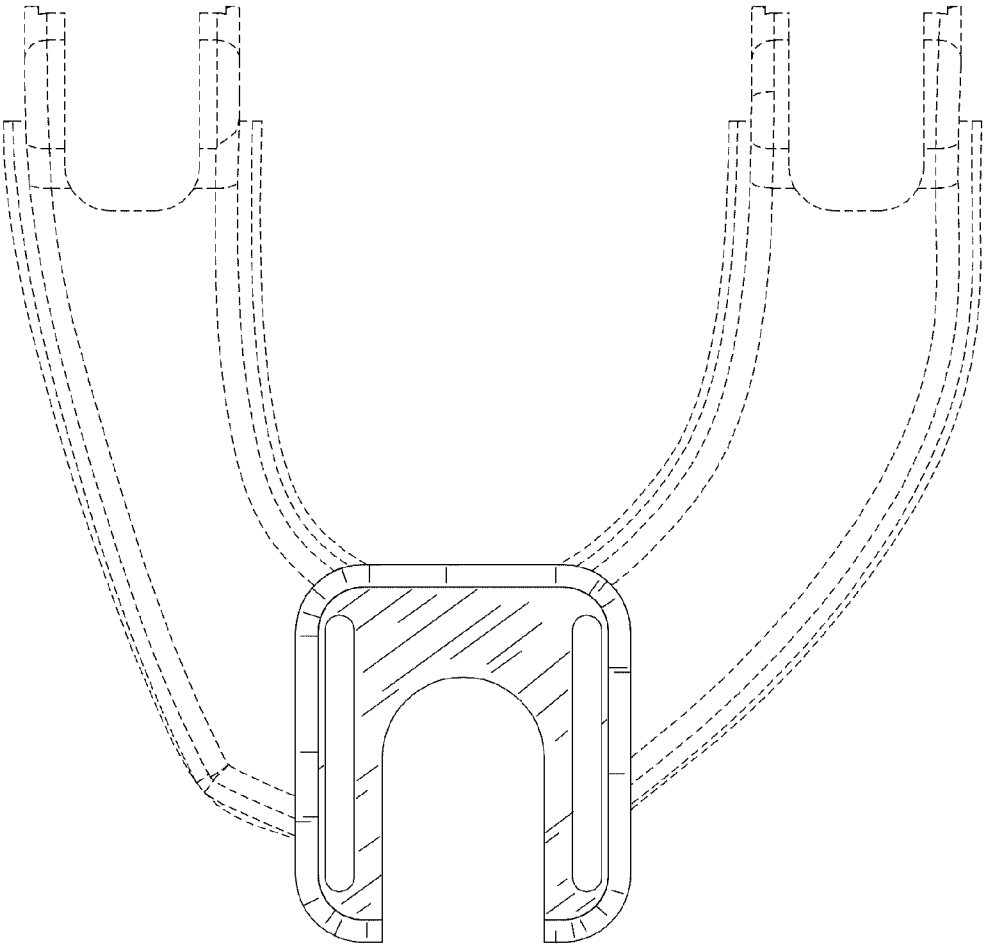


FIG. 5

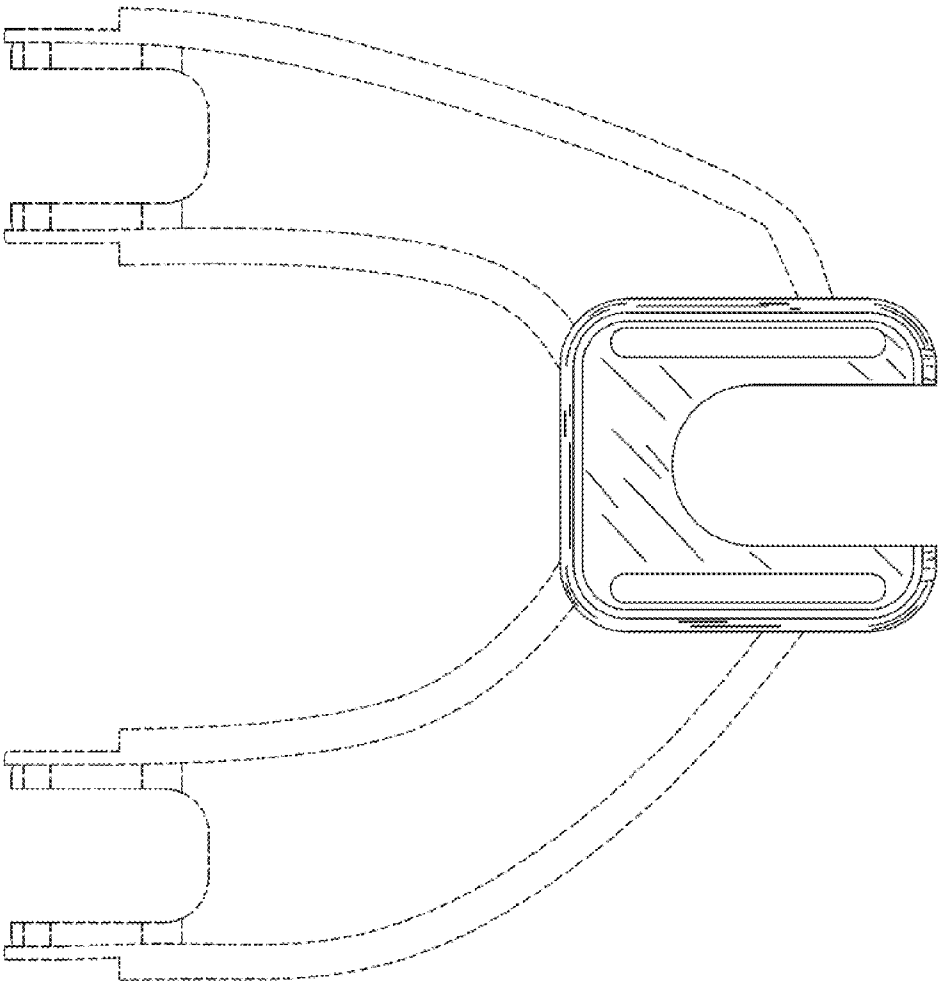


FIG. 6

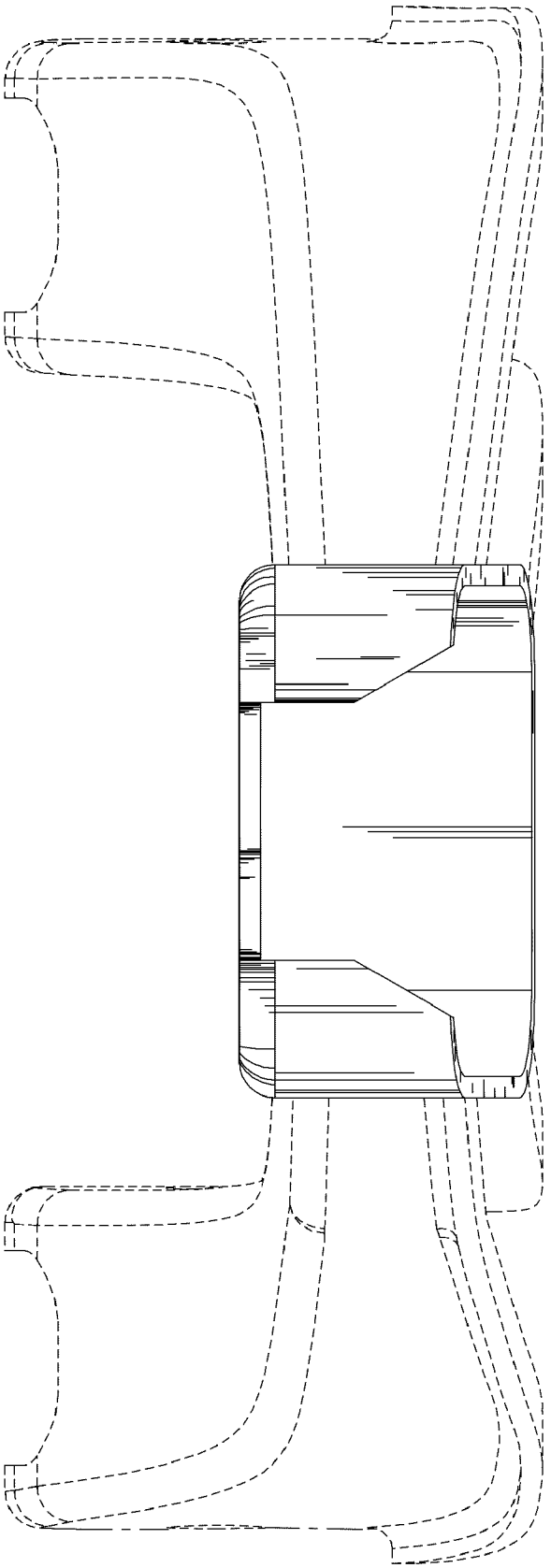


FIG. 7

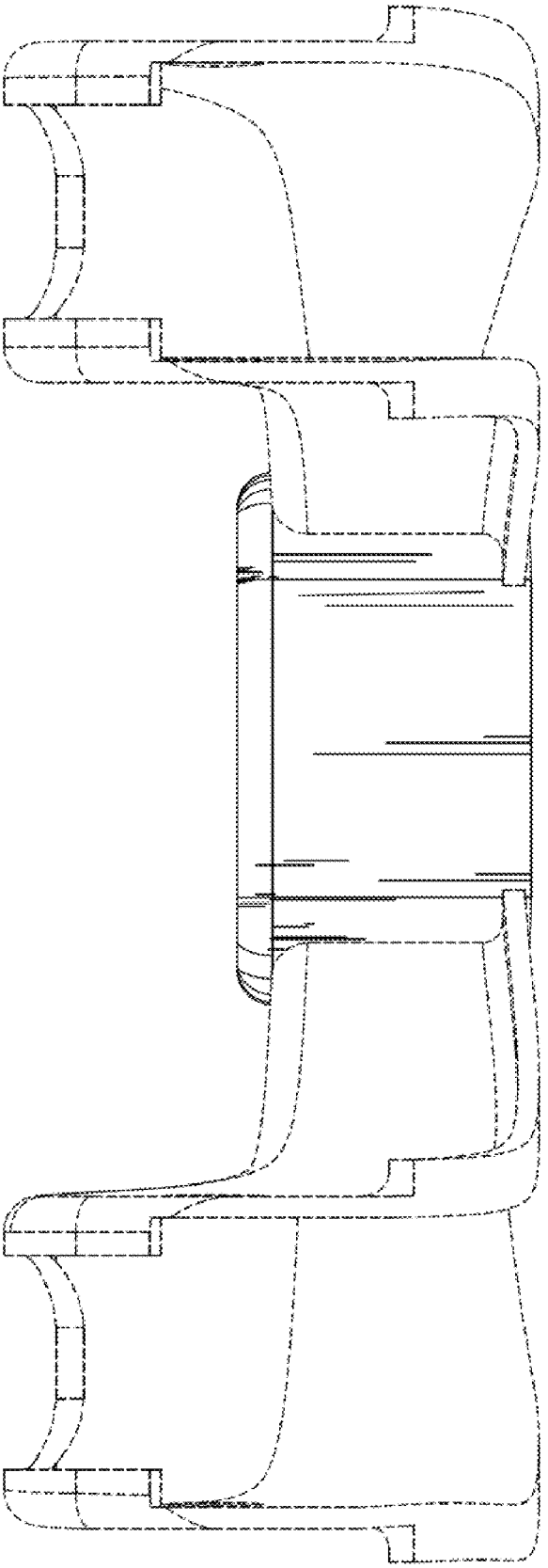


FIG. 8

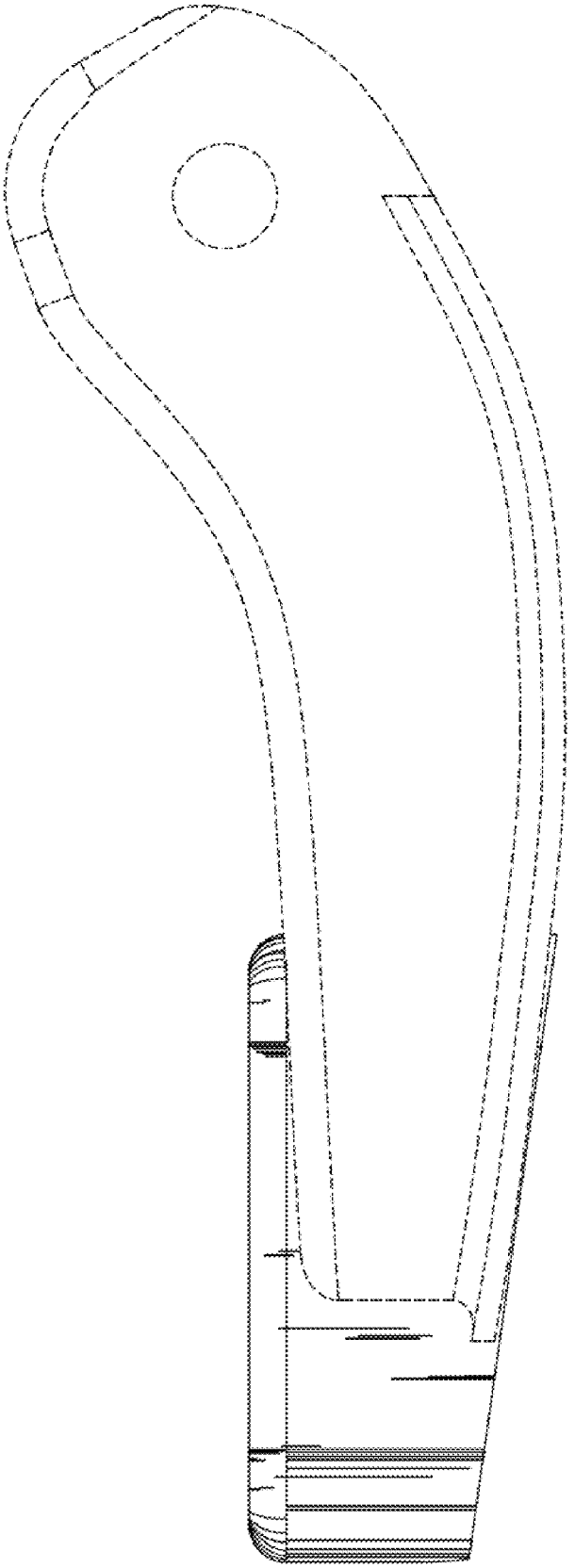


FIG. 9

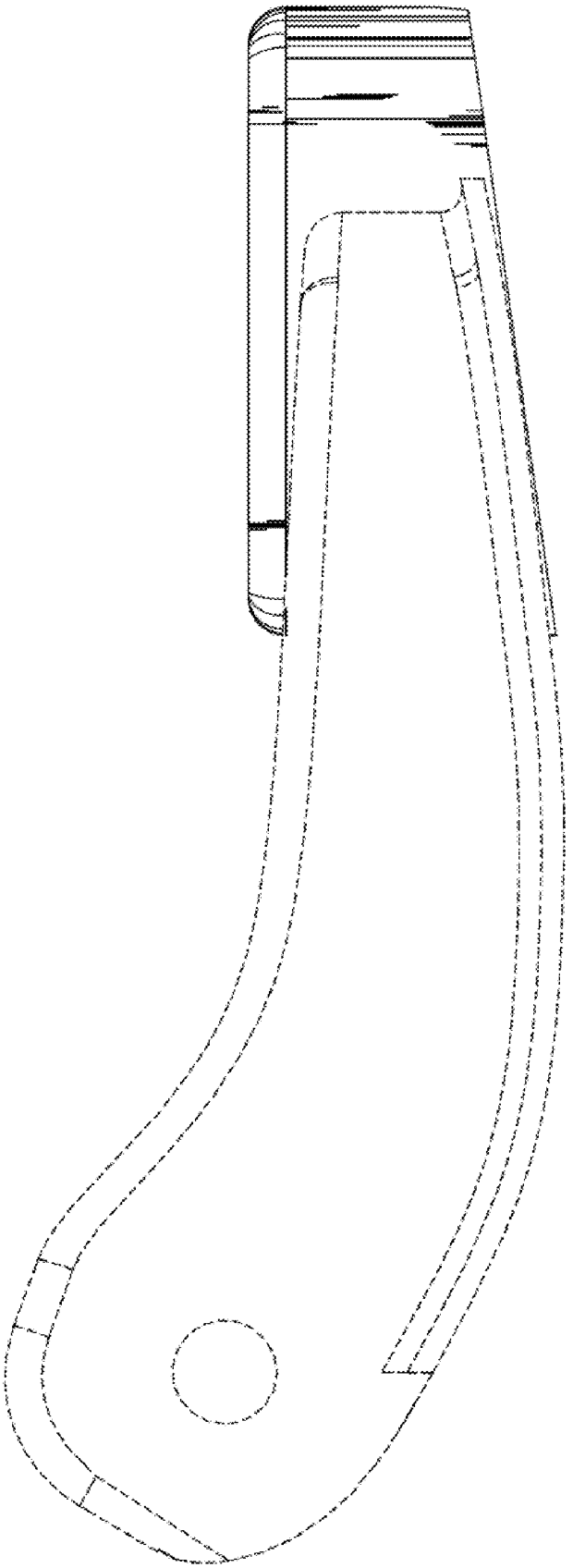


FIG. 10

EXHIBIT D - Infringing Camber Arm

NGINEERING FRONT+REAR CAMBER CONTROL KIT ARM 96-00 HONDA CIVIC EG EJ EM GOLD for Sale

Price: $194

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J2 ENGINEERING FRONT+REAR CAMBER CONTROL KIT ARM 96-00 HONDA CIVIC EG EJ EM GOLD

SKU: J2-CBK-F-HC88+J2-CBK-HC96-GD

J2 Engineering Adjustable High Strength Front Camber Kit

When a car's suspension is upgraded with lowering springs, the result is a lower ride height, a more aggressive look, and better handling due to the lowered center of gravity. While those things are great improvements for the car, the tires suffers from increased wearing and tearing since the tires will slant inwards towards the inside fender. A camber kit will allow the car to remain at the lowered

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Similar 1/4 mile timeslips to browse:

2003 Honda Civic EX coupe: 6.525 @ 213.500
stephan papadakis, Engine: acura nsx, Turbos: twin 64mm Tires: toyo

1995 Honda Civic DX: 8.192 @ 174.080
Kenny Tran - Jotech, Engine: 1.8 Liter, Turbos: Garrett GT4202 Tires: M/T

2000 Honda Civic SI: 8.411 @ 175.320
Stephanie Eggum, Engine: B18C1, Turbos: GT42R 74mm Tires: Mickey Thompson

2003 Honda Civic ex: 8.680 @ 169.000
John Brown, Engine: b18c, Turbos: t72 Tires: gooyear

1990 Honda Civic DX Hatch: 9.200 @ 162.000
Jim, Engine: LS VTEC B18 LS Block and B16 Head, Turbos: T70 Tires: Full Slicks

1997 Honda Civic Coupe Dunlop NoLimit VTG: 9.439 @ 151.000
Witold Karalow, Engine: B16A, Turbos: GT40 Tires: M/T 28

1997 Honda Civic Coupe: 9.665 @ 150.000
Vogelsinger Sandor, Engine: B18B, Turbos: Garrett

ride height while correcting the angle of the tire closer to the spec it was supposed to be.

Features & Benefits:

- Made of High Quality Lightweight CNC Machined Steel Alloy Material with Anodized Aluminum Adjuster
- Corrects Camber +3.00 / - 3.00 Degrees and brings Quicker Response
- Improves Rear Suspension, Handling, Predictable Response and even Prevents Premature Tire Wearing.
- Ensure Even or Desired Contact with the Ground; i.e. Tires Wear more Evenly and Increases Traction and Handling
- Thicker and Stronger Lock Washers; Prevents Bolts from Getting Loose due to Engine Vibration and Road Conditions
- Hard Rubber Bushings for Extra Durability and Relativeness in Daily Driving or Tracking Racing
- Features Low Profile Aluminum Top Plate for Additional Clearance and Higher Clamping Load for No-Slip Performance
- OE Type Paint-Coated for the Highest Durability
- Design for Street, Track or Drift Racing Precise Adjustments with Long Service Life
- Easy to Access Turn-Buckle Style Adjuster for Ease of Adjustment without the Need of Removal
- Direct Bolt-On Installation or Replacement

J2 Engineering Adjustable High Strength Rear Camber Kit

When a car's suspension is upgraded with lowering springs, the result is a lower ride height, a more aggressive look, and better handling due to the lowered center of gravity. While those things are great improvements for the car, the tires suffers from increased wearing and tearing since the tires will slant inwards towards the inside fender. A camber kit will allow the car to remain at the lowered ride height while correcting the angle of the tire closer to the spec it was supposed to be.

Features & Benefits:

- Made of High Quality Lightweight CNC Machined Steel Alloy Material
- Corrects Camber +4.00 / - 4.00 Degrees and brings Quicker Response
- Improves Rear Suspension, Handling, Predictable Response and even Prevents Premature Tire Wearing.
- Ensure Even or Desired Contact with the Ground; i.e. Tires Wear more Evenly and Increases Traction and Handling
- OE Type Paint-Coated for the Highest Durability
- Design for Street, Track or Drift Racing Precise Adjustments with Long Service Life
- Direct Bolt-On Installation or Replacement

100% Brand New
Professional Installer is Highly Recommended

- No Instruction Included

Package Includes:

- 1 X Set (Right+Left) of Front Camber Kits
- 1 Set (Right+Left) Rear Camber Control Kits as Shown in the Picture Above

Application:

- 96-00 Honda Civic EJ8/ EJ7/ EJ6/ EM1

Range of Adjustibility is Estimated on Trial, Actual Range depends on Applications

NOTE: Minor modifications or adjustments may be needed for some of our products. Installation instruction not included. Professional installation strongly recommended for high performance/racing automotive parts. Please excuse us from any possible typos and unintentional misinterpretations. You are more than welcome to contact us for questions and concerns. Thank you!

-30 Days money back, please notify us within30 days after you've received your purchased item.
- All return requests must be submitted through your account.
- You have to obtain a RMA (Return Merchandise Authorization) number from us, and have the RMA number written on the return package.
- Buyers pay for return shipping fee.

Tires: Yokohama,M/T

1995 Honda Civic vx hatchback: 9.680 @ 155.000
kyle, Engine: b18c1, Turbos: garrett gt4294r Tires: 24.5x8.5x13 m&h slicks

2007 Honda Civic 8th Civic SI: 9.849 @ 155.960
Everton Carvalho, Engine: K24, Turbos: GTX4202 Tires: M/T 24,5x8

1992 Honda Civic CX: 9.870 @ 145.660
Alexei Guinitaran, Engine: 1.8 L, Turbos: 60-1 Tires: M/T 24.5 x 9

1993 Honda Civic Street all motor : 9.871 @ 138.833
Adel tuning, Engine: drag cartel k26,

1998 Honda Civic Turbocharger: 9.930 @ 142.190
Angela Proudfoot, Engine: B18, Turbos: Turbonetics custom

1994 Honda Civic Coupe: 9.980 @ 145.580
Angel Robles, Engine: 1.8 acura integra gs, Turbos: 60-1 Tires: m&h

1993 Honda Civic cx: 10.050 @ 144.440
joytech, Engine: b18c, Supercharger: n/a Turbos: gt40/ Tires: 24.5 x 9.5

1996 Honda Civic EX Coupe: 10.081 @ 146.430
Shannon, Engine: B18C, Turbos: GT40/35R

1993 Honda Civic cx: 10.200 @ 142.000
dean, Engine: 2.0L gsr, Turbos: ITS 62-1 Tires: 24.5x8.5x14

1992 Honda Civic si: 10.350 @ 141.000
jared wahl, Engine: b18c1 block guarded 82mm stock sleeves, Turbos: t70 Tires: mickythompson 24.5x8x13

1996 Honda Civic DX LS1: 10.395 @ 132.610
Travis Chaney, Engine: LS1, Tires: 26x10.50 Hoosiers

1994 Honda Civic Coupe: 10.400 @ 137.860
John Brown, Engine: 1.8 acura integra gs, Turbos: t3/t4 Tires: m&h

1986 Honda Civic SI, AH5: 10.416 @ 125.000
Jimmy Fernandez, Engine: B16a, Turbos: GARRETT T3/T4 60mm / 63mm Tires: FRONT full slick M/H / BACK 205/R50/15 KUMHO ECSTA

- Items to be returned must be in resalable condition.
- All returns are for refund ONLY. No exchange accepted.
- Returns for refund are subject to a 20% restocking fee.

- We accept the following payments: Paypal
- eChecks will be held until cleared.
- We are not responsible for any address changes after the payment has been made.
- Sales tax applies to California residents.
- VERY IMPORTANT: Please make sure you input the correct shipping information at checkout. We are not responsible for incorrect or undeliverable addresses.
- Shipping and handling for Continental US (48 contiguous states).
- Shipping to PR, HI, AK and PO Box addresses will be charged the same as shipping to Canada.
- US Territories and Military such as GU, VI, SAIPANwill be charegd the same as international shipping rate. Transaction will be held until a full shipping amount received. No APO/FPO address will be accepted or shipped.
- Some of the packages cannot be delivered to a PO Box. Customer is responsible to ensure PO Box address given is deliverable by the shipping company. Package will be held until a valid physical address is provided.
- Customer assumes shipping charges incurred in shipping to undeliverable address.
- International orders can check the shipment calculator on top to find out shipping costs. International buyers are responsible for all customs duties, taxes, and other applicable fees incurred by the countrys customs/border regulations. Please contact customs for more information.
- We ship 98% of all orders the same or next business day after payment received/cleared. Please understand that once orders are shipped, we cannot control the transit times thereafter. Most orders will ship via USPS First Class/Priority Mail or FedEx/UPS or the best suitable carrier for the specific size of the product.
- For Canada shipping please select the lowest price. We do notoffer expedited shipping.

- For emissions related items, please check with your local jurisdiction for emission specific requirements before purchasing.
- All items do not come with installation instruction unless otherwise specified.
- If item is questionable, please consult your local professional/mechanic before making purchase.
- Got any questions about this listing or the product that you've already purchased?
- Please feel free to contact us by using the link "Ask a question" above. Please notice that no emails will be replied during weekend and holidays.
- Product Business Hours: Monday - Friday, 10 AM to 6 PM (Pacific Time).

J2-CBK-HC92-SL

J2 ENGINEERING

Location: FRONT

Color: SILVER

Correction: CAMBER +3.00 / -3.00

Fitment: 92-95 HONDA CIVIC / 93-97 DEL SOL
94-01 ACURA INTEGRA

EXHIBIT I - Advertisement for 2nd Infringing Camber Arm

BBN-Performance.com
For all you Honda & Acura performance parts needs!
"Let us make your ride Notorious too!"

Sales line:
(602) 339-0308

Visit our retail showroom!

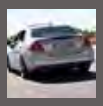
2231 S 7th. Ave
Suite #1
Phoenix, AZ 85007

9AM-5PM Mon-Fri
10AM-3PM Sat

Built By Notorious

SEARCH Go!

SHOP FOR PARTS
NOTORIOUS COMBO'S (SUPER SAVINGS)
HID KITS
PHOTO GALLERY
Notorious Blog
YouTube Channel
Sponsored Vehicles
Tech/DIY



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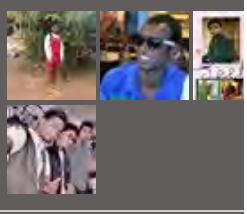

Home > SHOP FOR PARTS > DNA MOTORING > CAMBER KITS > DNA Red Front Camber Kit 1988-1991 Honda Civic & Crx

Sales Line 602-339-0308

DNA Red Front Camber Kit 1988-1991 Honda Civic & Crx

Item# CBK-HC88-RD

List Price $199.99

Notorious Price: $69.50

Add to cart

Like Sign Up to see what your friends like.

DNA Red Front Camber Kit 1988-1991 Honda Civic & Crx

ADJUSTABLE FRONT CAMBER KIT

- Made of High Grade Steel Light Weight Design
- CNC Machined Color Powder Coated for Durability
- High Performance JDM Spec. Adjustable Joint Ball
- Direct OE Factory Fitment Or Replacement
- Ultimate Hangling to Adjusted +/- 2 Degree
- Fully Adjustable for Rally, Drift or Road Course Use

Can't find what you're looking for?
Call our Sales Line or click above to send us an Email.

*While we strive to provide accurate representations, some images may vary from the actual product.
Prices and terms subject to change without notice.

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**At this time, we can only offer shipping to our customers in the continental United States.

"Let us make your ride Notorious too!"

EXHIBIT J - Advertisement for 3rd Infringing Camber Arm

FOR S2000 S2K AP1 AP2 PERFORMANCE RED FRONT UPPER+REAR LOWER CAMBER CONTROL ARM

Best Quality! Best Value! Fast & Free Shipping!

Item condition: **New**

Compatibility: See compatible vehicles

Quantity: 1 More than 10 available

Price: **US $165.99**

Buy It Now

Add to cart

2 watching

Add to watch list

Add to collection

Free shipping | New condition | Experienced seller

Seller information

Shop DNAMotoring on eBay

DNA Motoring came about more than a decade ago with only one thing in mind and that was providing performance parts solutions to the car enthusiast. Being car guys ourselves, we understand first hand on what the community demands and what it thrives

Follow this seller

See other items

Shipping: **FREE** Standard Shipping | See details
Item location: **Rowland Heights, California, United States**
Ships to: **Americas, Europe, Asia, Australia** See exclusions

Delivery: Estimated between **Wed. Feb. 25 and Fri. Mar. 6**

Payments: PayPal VISA MasterCard American Express Discover
Credit Cards processed by PayPal

PayPal CREDIT
Spend $99+ and get 6 months to pay Apply Now | See Terms
See details

Returns: 14 days money back, buyer pays return shipping | See details

Description | Shipping and payments

eBay item number: 161599728100

Seller assumes all responsibility for this listing.

Item specifics

Condition:	New	Placement on Vehicle:	Front
Brand:	DNA Motoring	Surface Finish:	Paint Coated
Materials:	Alloy Steel	Warranty:	Yes
Color:	Red		

DNAMotoring

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FOR S2000 S2K AP1 AP2 PERFORMANCE RED FRONT UPPER+REAR LOWER CAMBER CONTROL ARM









ITEM SKU: CBK-F-S2000-RD+TOA-S2000-R

[*] PRODUCT DESCRIPTION

Front Camber Kit:
When a car's suspension is upgraded with lowering springs, the result is a lower ride height, a more aggressive look, and better handling due to the lowered center of gravity. While those things are great improvements for the car, the tires suffers from increased wearing and tearing since the tires will slant inwards towards the inside fender. A camber kit will allow the car to remain at the lowered ride height while correcting the angle of the tire closer to the spec it was supposed to be.

Rear Lower Toe Control Arm:
Racing TCA's are forged from High Quality Stainless Steel and are designed as direct replacements with weight reduction over weaker stock components. These extremely strong and lightweight TCA's help reduce the amount of camber when lowering your vehicle's suspension. As a result, a wider wheel and tire combination can be used with little or no tire rubbing.

INCLUDE:
- 1 x Set of (Right+Left) Front Camber Adjuster Kit
- 1 x Set of (Right+Left) Rear Lower Toe Control Arm

FEATURES:
Front Camber Kit:
- Made of High Quality Lightweight CNC Machined Steel Alloy Material
- Corrects Camber +/- 3.00 Degrees and brings Quicker Response
- Ensure Even or Desired Contact with the Ground;
  i.e. Tires Wear more Evenly and Increases Traction and Handling
- OE Type Powder-Coated Bushing Finish for the Highest Durability
- Direct Bolt-On Installation or Replacement

Rear Lower Toe Control Arm:
- Adjustable Length to Minimize Camber and to Bring Quicker Response in Different Conditions such as Track, Drag or Drifting
- Adjustable Length to Tune Front-Caster and to Stabilize Traction during Breaking and Acceleration, which Improves Handling Ability
- Pillow Ball Design, further Improves Handling especially during Cornering; Eliminates Flex from Regular Bushing
- Lightweight, Less Load to a Vehicle, Comparing to OE Stock Products
- Made of High Quality Stainless Steel Alloy
- Designed to Withstand Tough Road Condition, Big Save on Alignment Every Time after Hitting a Bump
- Direct Bolt-On Installation or Replacement; Easy for Installation

NOTES:
- **100% Brand New**
- **Professional Installation is Highly Recommended**
- **Installation Instruction is NOT Included**

WE HIGHLY RECOMMEND PROFESSIONAL INSTALLATION!

[*] RELATED PRODUCTS

[*] PAYMENT INFORMATION

- We accept PayPal payments. (e-check takes 3-7 business days to be processed. We will not ship until it is cleared)
Payment Options Overview:

[*] SHIPPING INFORMATION

- **Domestic Shipping** rates apply to all 48 contiguous states.
- **PR, HI, AK and PO Box addresses** shipping rates are the same as CANADA shipping.
- **US Territories and Military** such as **GU, VI, SAIPAN, APO/FPO** will be charegd the same as international shipping rate. Transaction will be held until a full shipping amount received.
- For **Canada shipping** please select **the lowest price**. We do not offer expedited shipping.
- **Some of the packages cannot be delivered to a PO Box.** Customer is responsible to ensure PO Box address given is deliverable by the shipping company. Package will be held until a valid physical address is provided.
- Items will be shipped 24 hours of payment verification.
- All international orders may be subject to their custom fees or brokerage fees or duty tax which we do not pay.
- All buyers must pay for their own customs fees or brokerage fees or duty tax.
- These fees vary due to price of item and government rate. Please contact your government website or shipping company to calculate fees.
- We are not responsible for any changed of address after item has been shipped.

IMPORTANT NOTICE:
We ship all our items either via UPS/FEDEX or USPS. If there is no specific request prior to purchasing, we will ship either method.

Very Important Shipping Policy:
We only could ship to the address that's stated on your PayPal account as the shipping address unless the correct address was stated on the PayPal notes section. E-mailing us after you have made payment does not count so pleas update your shipping address on PayPal before making a payment. Thanks.

[*] RETURN POLICIES

- 14 Days money back, please notify us within 14 days after you've received your purchased item.
- All return requests must be submitted through your Ebay account.
- You have to obtain a RMA (Return Merchandise Authorization) number from us, and have the RMA number written on the return package.
- Buyers pay for return shipping fee.
- Items to be returned must be in resalable condition.
- All returns are for refund ONLY. No exchange accepted.
- Returns for refund are subject to a 20% restocking fee.

Note: Most items DO NOT come with instruction of Installation otherwise stated above, the buyer are responsible of the installation. If item is questionable, please consult your local professional/mechanic before making purchase.

[*] CONTACT INFORMATION

Got any questions about this listing or the product that you've already purchased? Please feel free to contact us by using the link below! Please note that we are closed during weekend and holidays.

DNA Motoring Business Hours: Monday - Friday, 10 AM to 5 PM PST.

Have Questions? Send Us A Message!

For emissions related items, please check your local jurisdiction for emission specific requirements before purchasing.

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Questions and answers about this item
No questions or answers have been posted about this item.
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